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ABSTRACT

In conjunction with the Minnesota Office of Statewide Educational Assessment, the Bloomington Public Schools conducted an assessment of progress within the district. This report, prepared for dissemination to the school board, school staff and interested citizens, summarizes the results of the local assessment. Data concerning the achievement of 9-, 13-, and 17-year old students is included. Achievement of Bloomington students is compared with that reported for the entire state, the U.S., and for similar suburban communities both within the state and across the country. The interaction of achievement with student characteristics is also examined. Data collected were compared with a criterion determined by teachers' assessment of the importance of objectives (items). Using this criterion, a committee of teachers judged the assessment results as indicative of strength, potential strength, acceptability, potential need or need. Clusters of objectives, items of special interest, and detailed data are included in the volume. (SD)

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BLOOMINGTON MATHEMATICS ASSESSMENT

A REPORT TO CITIZENS, STAFF AND SCHOOL BOARD

BEST COPY AVAILABLE

Department of Evaluation
Bloomington Public Schools
November, 1975

Fred M. Atkinson
Superintendent of Schools

Orville Ruud

SE 020 748

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Introduction 1
Overall Results 4
Concerns 6
Recommendations 7

CHAPTER I THE BLOOMINGTON ASSESSMENT PROGRAM

1.1 Background and Purpose of the Bloomington Educational Assessment Program 8
1.2 Design and Implementation of Bloomington Mathematics Assessment 10

CHAPTER II ANALYSIS OF MATHEMATICS PERFORMANCE BY OBJECTIVES IN COMPARISON TO TEACHER STANDARDS AND IN COMPARISON TO OTHER MINNESOTA STUDENTS

2.1 The Analysis Process 15
2.2 Nine-Year-Old Performance 15
2.3 Thirteen-Year-Old Performance 30
2.4 Seventeen-Year-Old Performance 39
2.5 Summary 56

CHAPTER III ANALYSIS OF MATHEMATICS PERFORMANCE CONTENT BY CLUSTERS AND IN CONTRAST TO CHARACTERISTICS OF STUDENTS

3.1 Introduction 57
3.2 Performance by Content Clusters 60
3.3 Performance by Student Characteristics 62
3.4 Summary 68

CHAPTER IV ANALYSIS OF BLOOMINGTON PERFORMANCE BY ITEMS IN COMPARISON WITH MINNESOTA AND THE NATION

4.1 Introduction 69
4.2 Performance by Item for 9, 13 and 17-year-olds 70
4.3 Summary 70

CHAPTER V ANALYSIS OF GROWTH OF BLOOMINGTON STUDENT PERFORMANCE BY SIMILAR TEST ITEM RESULTS BETWEEN AGES 9, 13 and 17-YEAR-OLDS

5.1 Introduction 71
5.2 Overlap Performance 71
5.3 Summary 72
APPENDIX 73

BLOOMINGTON MATHEMATICS ASSESSMENT

EXECUTIVE SUMMARY

INTRODUCTION

This report describes the mathematics performance of Bloomington 9, 13, and 17-year-old students in an assessment of mathematics conducted in cooperation with the Minnesota Department of Education. Strengths and weaknesses of the mathematics performance are reviewed and serve as the basis for the recommendations and conclusions of this report.

This summary briefly describes the findings of this assessment. The concerns and recommendations expressed are those of the mathematics analysis committee. The complete report gives more specific information and provides the basis for this summary.

The assessment required the cooperation and support of all building principals and teachers to accomplish the necessary testing. Staff members also were involved in developing ratings of expected performance and analyzing results. These persons participated:

Teacher Rating Committees

9 Year Olds

Karen Maday, Brookside
Nan Brenholdt, Cedarcrest
Rosie Gagstetter, Hillcrest
Lu O'Connell, Humboldt Heights
Linda Tetrault, Indian Mounds
Linda Olchefski, Nine Mile
Ardelle Hansen, Normandale Hills
Inez Smith, Northgate
Pat Kramer, Oak Grove
Al Cook, Olson
Bonnie Westermoe, Park
Harriet Iverson, Pond
Bonnie Holman, Poplar Bridge
Inez Gustafson, Ridgeview
Jody Wahlig, River Ridge
Joyce Peterson, Riverside
Bev Tomes, Southwood
Jean Gesche, Valley View
Mary Ann Goolsbey, Washburn
Jim Gronvall, Westwood
Sherry Seeman, Hillcrest
Karen Schmidt, Olson Jr.
Eldon Flatten Oak Grove

13 Year Olds

Dave Suman, Olson Jr.
Karen Schmidt, Olson Jr.
Jack Pensinger, Oak Grove Jr.
Richard Olson, Oak Grove Jr.
Lawrence Pearson, Penn
Cecil Frank, Penn
Laurel Trimbo, Portland
Donald Monthriand, Portland
Sherry Seeman, Hillcrest
Judy Halvorson, Kennedy

17 Year Olds

Dr. Louis Cohen, Jefferson
Rod Lingenfelter, Jefferson
Judy Halvorson, Kennedy
Blake Jaskowiak, Kennedy
Harry Kitts, Lincoln
Neil Hamrin, Lincoln
Dick Snydle, Jefferson
Dorothy Ziebel, Kennedy
Tom Lampi, Lincoln
Karen Schmidt, Olson Jr.
Donald Montbriand, Portland
Judy Halvorson, Kennedy

Analysis and Reporting Committee

Harry Kitts	Lincoln	Richard Olson	Oak Grove Jr.
Blake Jaskowiak	Kennedy	Cecil Frank	Penn
Rod Lingenfelter	Jefferson	Jody Wahlig	River Ridge
Don Montbriand	Portland	Charles (Al) Cook	Olson Elementary
Karen Schmidt	Olson Jr.	Sherry Seeman	Hillcrest

The Bloomington Assessment was directed by Dr. Donald Weiss and by Orville Ruud. The overall State Assessment program is under the direction of Dr. John Adams. Dr. Rosemary Schneiderhan provided our district with liason advice and worked with us through the rating and analysis activities.

The total State Assessment Staff supported this activity. The State Assessment staff includes:

Dr. John Adams
Director
Office of Statewide Educational Assessment

Dr. Rosemary Schneiderhan
Coordinator
Office of Statewide Educational Assessment

Dr. William McMillan
Supervisor, Instrumentation & Development
Office of Statewide Educational Assessment

SCORING, DATA ANALYSIS AND REPORTING

All open-ended exercises were scored by National Computer Systems, Minneapolis, Minnesota, by coding student responses into several categories of correct and incorrect responses to allow for diagnosis of the types of errors made by seventeen-year-olds. A raw data tape was then created of all responses from student questionnaires, student performance booklets, school questionnaires and district questionnaires.

Triangle Research Associates edited the statewide tape, built the data analysis file and produced the output necessary for data analysis. TIES Research Division produced the output for Bloomington's results.

The Office of Statewide Educational Assessment analyzed the state data and prepared the written reports of the state results.

Orville Ruud and Dr. Rosemary Schneiderhan prepared written reports of the results of Bloomington student performance. Teacher members of the analysis and reporting committee wrote statements of overall results, concerns and recommendations.

Shirley Mansur and Dorothy Gardner of the Elementary Division Office and District Evaluation Office organized and typed the report for printing.

FURTHER ASSESSMENT

Bloomington Relative Assessment For Public Reporting is supported through the existance of a District Evaluation Advisory Committee which has the specific tasks of recommendations to the Superintendent of Schools:

(1) Areas for district evaluation
(2) Strategies for district evaluation
(3) Position statements and descriptions of the overall structure and purpose of evaluation through the district.

Recommendations of the Evaluation Advisory Committee are channeled to the District Administrative Advisory Committee and the Superintendent's cabinet.

A description of this District Evaluation Advisory Committee is found in Appendix 1.1.

SUMMARY

OVERALL RESULTS

The assessment established that Bloomington students have good computation skills, mathematical concepts and facility in problem solving. The 17-year-old age group had the least exemplary performance.

Bloomington students performed well in the assessment as judged against the performance of others and the expectation of their teachers.

Performance of Bloomington 9 and 13-year-olds consistently equaled or exceeded the performance of their counterparts across the state and across the nation. Performance of Bloomington 17-year-olds was less exemplary, most often equaling but not often exceeding, the performance of their counterparts across the state.

Bloomington teachers expect high performance from their students. Against these teacher standards Bloomington students at all levels have some areas for improvement.

Assessment results supporting these statements came from analysis of student performance at each level (9, 13 and 17-year-olds) according to student achievement within:

(1) Approximately 66 specific objectives of mathematics instruction.

(2) 10 to 15 clusters of mathematics content.

(3) Test questions also used in the national assessment.

(4) Different types of students (i.e. boys/girls) likes or dislikes math.

(5) Comparisons of achievement of 9, 13 and 17-year-olds on the same items.

1. Achievement of the objectives of mathematics instruction

(1) Teacher Criteria

In contrast to the performance levels expected by their teachers, Bloomington student performance was judged acceptable (meeting expectations) or strong (exceeding expectations) on the following per cent of objectives of instruction.

9-Year-Olds	13-Year-Olds	17-Year-Olds
51%	58%	67%

(2) Comparison To State

In contrast to statewide performance, Bloomington student performance was judged acceptable (meeting state performance) or strong (exceeding by over 2% state performance) on the following percentage of objectives of instruction.

9-Year-Olds	13-Year-Olds	17-Year-Olds
96%	86%	93%

2. Performance by clusters of mathematics content.

Performance in clusters representing general mathematics content (e.g. computation skills, measurement, geometry, etc.) equalled or surpassed the performance of students across the state in the following per cent of these clusters.

9-Year-Olds	13-Year-Olds	17-Year-Olds
100%	93%	80%

3. Comparison of Bloomington performance with the state and nation.

Certain test questions that had been used by national assessment allowed this comparison with national results.

Comparative Bloomington Performance by % of items

		Bloomington Significantly Above*	No Difference	Bloomington Significantly Below *
Bloomington vs Minnesota	9	38.7	58.1	3.2
	13	38.8	57.4	3.7
	17	7.3	83.6	9.1
Bloomington vs Minnesota Suburbs	9	29.0	61.3	9.7
	13	24.0	70.3	5.5
	17	0.0	81.8	18.2
Bloomington vs U.S.	9	71.0	22.5	6.5
	13	68.5	29.6	1.8
	17	29.1	65.4	5.5
Bloomington vs U.S. Suburbs	9	29.0	64.5	6.5
	13	29.6	68.5	1.8
	17	14.6	83.6	1.8

* Not attributable to chance in 95/100 cases.

4. Performance by student characteristics

(1) Performance of Bloomington girls and boys was the same at all three age levels. (Statewide performance indicated that girls outperformed boys at ages nine and thirteen, while boys outperformed girls at age seventeen.)

(2) Bloomington students liking mathematics significantly outperformed Bloomington students not liking mathematics.

(3) High S.E.S. (socio-economic status) students performed best and low S.E.S. students performed lowest at all three age levels.

(4) At age seventeen, the number of years that students were enrolled in mathematics classes was directly proportional to better mathematics performance. (Students with more years outperform students with fewer years.)

(5) Enrollment in vocational/technical courses was not related to mathematics performance.

5. Comparison of 9, 13 and 17-year-olds growth of achievement

To measure growth in mathematics skills and understanding between the ages 9, 13 and 17-year-olds, some identical questions were used in testing each age level. Bloomington 9, 13 and 17-year-olds do demonstrate growth in performance. The largest gains are in the areas of multiplication, division, word problems, geometry and algebra. Interestingly 13-year-olds outperform 17-year-olds on metrics.

Bloomington performance growth between 9 and 13-year-olds consistently exceeds that of statewide students but the performance growth between 13 and 17-year-olds does not keep pace.

CONCERNS

Although the overall performance of Bloomington students is commendable, certain specific concerns exist including:

(1) Subtraction with borrowing possibly is not being mastered by 9-year-olds and 9-year-olds are frequently unable to recognize equivalent mathematics statements. These are indicated as topics to be taught at this level in the scope and sequence.

(2) Even though by state standards only 3.7% of the 13-year-old objectives analyzed are recognized as needing instructional attention, Bloomington staff members have identified 14 objectives in basic skills areas as probably needing instructional emphasis On these objectives, listed in Chapter II, section 2.3, students did not perform above the 50% level expected.

(3) Bloomington 17-year-olds lack sufficient high school mathematics instruction as evidenced by appendix 3.3 comparison of 17-year-olds performance with Minnesota suburbs.

(4) Student mathematics performance shows a general decrease between ages 13 and 17 as reported in Chapter V, section 5.3.

(5) 17-year-olds show needs in consumer mathematics topics in the performance on objectives as reported in Chapter II.

(6) Bloomington performance in metrics although commendable by state standards should be improved to meet student needs today.

RECOMMENDATIONS

(1) Bloomington students, elementary and secondary mathematics teachers, administrative staff and our past mathematics coordinator should be commended for the excellent mathematics program.

(2) Review and update of the mathematics scope and sequence should be initiated.

(3) Consideration should be given to the idea of establishing a pre-graduation competancy based examination designed to encourage continued mathematical education and insure acceptable consumer mathematical functioning.

(4) Consider requirement of 1 year of mathematics after junior high.

(5) A follow up assessment of mathematics should be conducted each four years from now on.

(6) Monies should be set aside to implement these recommendations.

CHAPTER I

THE BLOOMINGTON ASSESSMENT PROGRAM

1.1 Background and Purpose

Background

Bloomington Relative Assessment forms a part of an overall design for evaluation. This committment to evaluation was made by School Board action.

MINUTES OF THE REGULAR MEETING OF THE BOARD OF EDUCATION
INDEPENDENT SCHOOL DISTRICT NO. 271
Bloomington, Minnesota

September 17,1974

VI. DISTRICT EVALUATION *Hilborn MOVED, Allen seconded, approval for the district to piggyback on state wide assessment in mathematics and test the Iowa Test of Basic Skills on a sample basis in grades three and six and report results to the Board; and that the administration develop a program of assessment of classroom instruction. Passed unanimously.*

For 1974-75 participation in a "piggy back" evalution of Bloomington mathematics within the state mathematics assessment was viewed as a means of accomplishing part of the relative assessment desired. Dr. Donald Weiss, Director of Data Processing and Evaluation, acted under the direction of the school board and superintendent to contract with the state assessment office for Bloomington participation. In January 1975, Orville Ruud, acting Director of Evaluation, assumed responsiblity for completion of the piggy back mathematics assessment.

The activities comprising the mathematics assessment occurred in this sequence within Bloomington and the state:

STATE	WINTER & SPRING	1972	Description of Objectives
	FALL & WINTER	1973	Writing of Exercises
	SPRING	1973	Field Testing of Exercises
BLOOMINGTON	DECEMBER	1974	Testing Thirteen-Year-Olds
	FEBRUARY	1975	Testing Nine-Year-Olds
	APRIL	1975	Testing Seventeen-Year-Olds
	APRIL & MAY	1975	Teacher Rating Committees Set Criteria of Expected Student Performance
	JUNE & SEPTEMBER	1975	Analysis & Report Committee Judges Strengths and Weaknessses
	OCTOBER & NOVEMBER	1975	Analysis & Report Committee Writes Conclusions and Recommendations
	NOVEMBER & DECEMBER	1975	Staff and Public Reporting

Purpose

The objective of relative assessment is to give a measure of how well overall our curriculum is doing in relationship to the expectations of others for that curriculum. The District Position Statement on Evaluation describes how this assessment relates to other evaluation.

POSITION STATEMENT

The purpose of evaluation is to prepare factual information to assist those responsible for decision-making in the Bloomington Public Schools. Evaluation is to be accomplished in the following areas:

District Relative Assessment for Public Reporting
Building Program Evaluation
Classroom Instructional Evaluation

The province of Relative Assessment is that of the Superintendent, the Assistant Superintendent in charge of Elementary Education, the Assistant Superintendent in charge of Secondary Education. Each assistant superintendent reports on division results to the Superintendent. The Superintendent is responsible for reporting the overall results to the Board of Education, who, as a group represents the public. The Superintendent is concerned with making decisions on the allocation of funds to set priorities based upon total curriculum needs, division needs, and/or program needs relative to the overall needs of the district curriculum, and to the generally accepted goals of the schools in the region, the state, and the nation. The assistant superintendent is concerned with making decisions on the allocation of funds between buildings and to set priorities based on instructional needs of the division and the buildings to implement curriculum.

The province of Program Evaluation is that of the assistant superintendent and the principal within the building. The assistant superintendent is responsible for directing the principal's development of program evaluation, monitoring the process of program evaluation and reviewing the use of the program evaluation outcomes and decisions. Results are reported to the assistant superintendent in charge, the teachers in the building, and the parents in the attendance area. The principal obtains information through program evaluation for decision-making relating to personnel assignment, space needs, materials, time allocation and budget development. The principal is concerned with decisions to set priorities to improve and maintain building programs of instruction.

The province of Instructional Evaluation is that of the principal and the teacher. The principal is responsible for directing the teacher's development of instructional evaluation and reviewing the use of instructional evaluation. The teacher is concerned with decisions to set priorities to accomplish and improve instruction. The teacher obtains information through instructional evaluation of how instruction is meeting the needs of the students. Results are reported to students, parents and the principal. From instructional evaluation the teacher decided appropriate content, media, sequence, activities and student groupings for each student. The teacher also obtains information from instructional evaluation on the overall effectiveness of the instruction for decision-making regarding teaching strategy, materials, and time allocations.

1.2 Design and Implementation of Bloomington Mathematics Assessment

The design of Bloomington Mathematics Assessment was to "piggy-back" on the comprehensive activities of state wide assessment. This required, within Bloomington, extending of the number of students tested and utilizing working groups of teaching staff for rating and analysis activities. Instrumentation and sampling for the assessment was provided from the state assessment office. The instrumentation required definition of objectives, writing of exercise packets, development of student questionnaires and the development of school questionnaires.

INSTRUMENTATION

1. Objectives: Initial objective development activities for mathematics assessment were undertaken in 1972 in conjuction with pilot phase activities of the Minnesota Educational Assessment Program. This pilot phase focused on grades three and six. Final sets of objectives for assessment of nine, thirteen and seventeen-year-olds were completed during the fall of 1973. The development of all objectives involved input from educators in higher education and public and private schools as well as from professional organizations and lay persons.

The structure of objectives remained consistent across ages, with emphasis given to appropriate age categories. Each set of objectives was written to cover six cognitive levels. The six cognitive levels were:

1. Recall and Recognition
2. Performing Mathematical Manipulations
3. Understanding Mathematical Concepts and Processes
4. Problem Solving
5. Analyzing Problem Situations
6. Appreciation

2. Exercise Packages: A team of six mathematics educators developed exercises based upon objectives to be measured. Judy Halvorson, Kennedy and Dr. Louis Cohen, Jefferson were part of this writing team. Content validity of exercises was established by another group of mathematics educators. Exercises were screened and then field tested with approximately 250 students for each age group in twelve schools representing large city, suburban and rural districts in the winter of 1975. Based upon field test results, a total of 210 performance exercises were divided into three approximately parallel packages requiring a total administration time of 100 minutes per package. In addition, three appreciation level exercises were included in each package. A total of fifty-six exercises were taken from National Assessment to provide a basis for comparison with national results on these exercises. Seventy percent of the exercises were multiple choice items and thirty percent were open-ended.

3. Student Questionnaires: The last six pages of each exercise package contained twenty-three questions which requested information from students related to the following kinds of variables: (1) grade, (2) sex, (3) racial background, (4) home and family background characteristics, (5) general attitudes toward school and mathematics, (6) participation in school programs, (7) mathematics materials used in instruction, (8) educational aspirations and (9) information concerning parental education and occupation.

4. School Questionnaires: Each school participating in the mathematics assessment provided information for each of the following classes of variables related to that school: (1) size and type of community, (2) socioeconomic characteristics of the school population, (3) characteristics of mathematics programs within the school, and (4) ratings of the adequacy of facilities, materials, and professional and supportive staff.

This data allows Bloomington comparison with similar district performance.

SAMPLE DESIGN

1. Statewide Sampling: A two stage stratified sampling design was used to select random samples of approximately 5,000 pupils for statewide testing for each of the packages of mathematics exercises used. The schools to be tested were selected in the first stage. The second phase was the random selected schools. The sample designs for the 9, 13, and 17-year-old groups had these characteristics:

(1) A random sample of students was drawn from each population; viz. of nine-year-old pupils, born between January 1 and December 31, of 1965; of thirteen-year-old pupils, born between January 1 and December 31 of 1961; and of seventeen-year-old pupils, born between October 1, 1957 and September 30, 1958.

(2) Each of the geographical reporting regions of the state (see Figure 1.1) was represented in the sample so that the results could be reported for each of them with statistical precision. These reporting regions are consistent with the Governor's planning regions, with the exception that Region 1 and 2 were combined to form Assessment Region 1.

(3) A matrix sampling approach was developed to shorten the length of individual student testing time. Each student selected in the sample took one of the exercise books of the mathematics exercises.

(4) Length of the assessment session for each student did not exceed two hours.

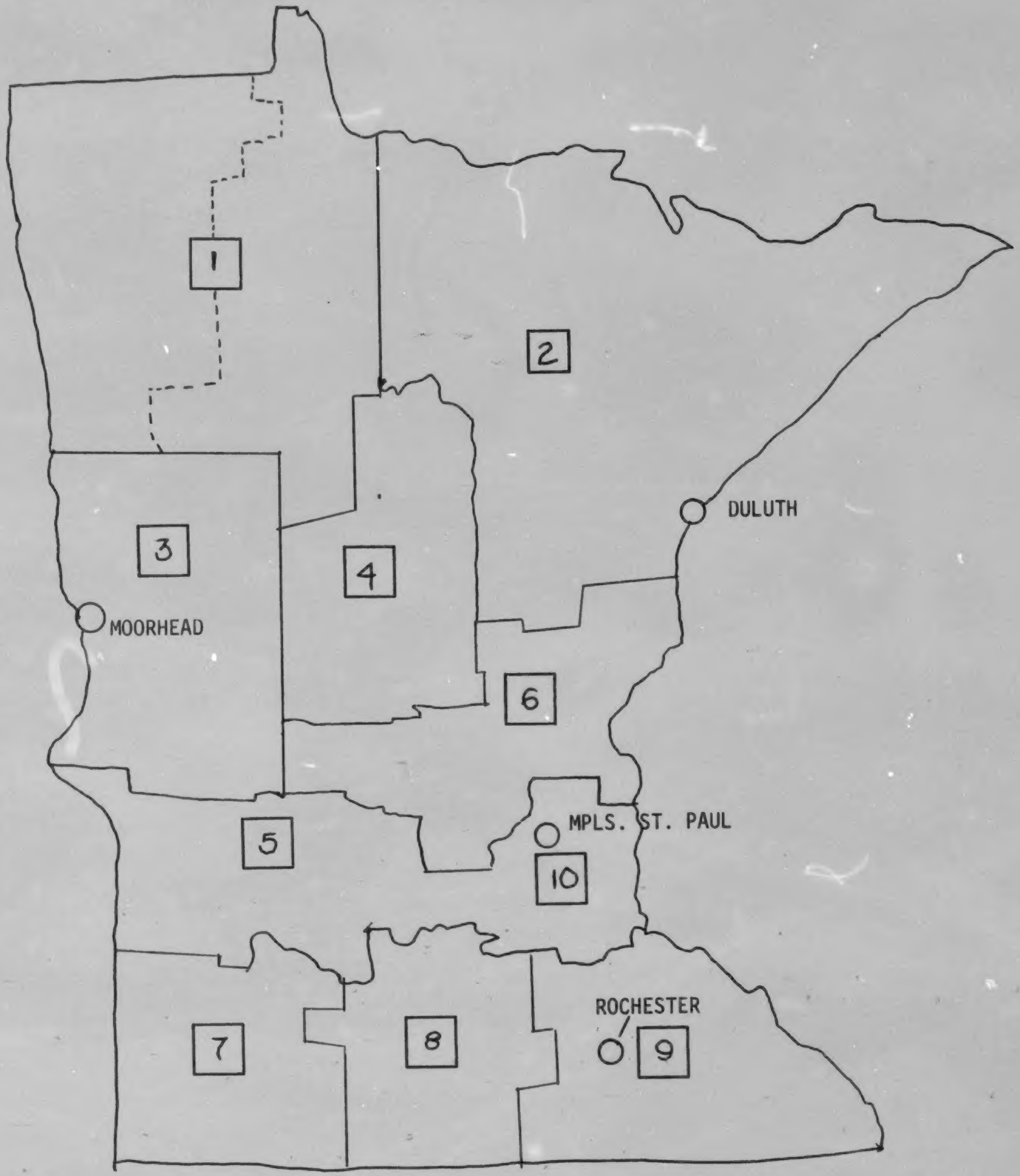

Figure 2.1

THE TEN ASSESSMENT REGIONS OF MINNESOTA

2. Bloomington Sampling: A random sample of pupils was drawn from the entire student population. The size of this sample was intended to allow generalization of results to the level where district performance would be assessed. Matrix sample design was used so that each student took only part of the total test package.

DATA COLLECTION

1. Statewide

The mathematics exercises of statewide assessment were administrated by a team of forty trained exercise administrators. Paced-tape recordings were used to standardize the administration of (1) directions given to students and (2) the time allotted for each exercise.

Table 1.1

STATEWIDE MATHEMATICS ASSESSMENT

DISTRICT/SCHOOL/STUDENT PARTICIPATION

PARTICIPANTS	9	13	17
School Districts	248	296	300
Public Schools	412	386	341
Non-Public Schools	72	57	28
TOTAL SCHOOLS	484	443	369

PARTICIPANTS	9	13	17
Students Selected	13,063	18,610	19,152
Students Participating	12,160	17,249	15,696
Students Not Participating	903	1,361	3,456
Student Participation Rate	93.1%	92.7%	82%

2. Bloomington Data Collection

Each participating student in the Bloomington schools was asked to complete one package of the mathematics exercises. Administration of the exercises was identical to that of the statewide program.

Table 1.2 includes student participation data for the Bloomington schools. The table indicates that of the students selected at each age level, 91.7% of the nine-year-olds, 91.8% of the thirteen-year-olds and 75.0% participated in the mathematics assessment.

Table 1.2

BLOOMINGTON MATHEMATICS ASSESSMENT

PARTICIPANTS	9	13	17
Students selected	600	900	909
Students participating	550	826	675
Students Not Participating	50	74	225
Student Participation Rate	91.7%	91.8%	75.0%

SCORING, DATA ANALYSIS AND REPORTING

All open-ended exercises were scored by National Computer Systems, Minneapolis, Minnesota, by coding student responses into several categories of correct and incorrect responses to allow for diagnosis of the types of errors made by seventeen-year-olds. A raw data tape was then created of all responses from student questionnaires, student performance booklets, school questionnaires and district questionnaires.

Triangle Research Associates edited the statewide tape, built the data analysis file and produced the output necessary for data analysis. TIES Research Division produced the output for Bloomington's results.

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Orville Ruud and Dr. Rosemary Schneiderhan prepared written reports of the results of Bloomington student performance. Teacher members of the analysis and reporting committee wrote statements of overall results, concerns and recommendations.

ANALYSIS OF MATHEMATICS PERFORMANCE BY OBJECTIVES IN COMPARISON TO TEACHER STANDARDS AND IN COMPARISON TO OTHER MINNESOTA STUDENTS

2.1 The Analysis Process

Results in this chapter will be reported by student performance on objectives, i.e. the number of objectives where student performance rated strong; the number where it rated weak.

Interpretation Committee Classification Procedure

A committee of Bloomington teachers provided a judgment concerning the strength or need of instructional practices based upon student performance on each objective as compared to:

(1) The criteria of teacher rating of desired performance (Criterion measure)

(2) The performance of other Minnesota students (Normative measure)

Student performance on each objective was judged to fall into one of the following classifications:

(1) Strength
(2) Potential Strength
(3) Acceptable
(4) Potential Need
(5) Need

Approximately a 2% difference was used as a guideline to judge a strength comparison to statewide performance.

2.2 Student Performance by Objectives - Nine-Year-Olds

Summary of Student Performance by Objectives

Table 2.1 below gives a breakdown of the number and percentage of objectives by performance level.

CLASSIFICATION OF PERFORMANCE ON
OBJECTIVES FOR NINE-YEAR-OLDS

Classification	Teacher Criteria		Comparison to Statewide Performance	
	Number of Objectives	Percent of All Objectives	Number of Objectives	Percent of All Objectives
Strength	14	21	32	48
Potential Strength	6	9	1	2
Acceptable	14	21	31	47
Potential Need	7	11	0	0
Need	25	38	3	4
TOTALS	66	100	66	101

As can be seen in the preceeding table, performance levels for 9-year-old pupils on 34 of the 66; objectives by teacher criteria measure and 63 of the 66 objectives by comparative measure were judged as acceptable or above.

Performance levels on 32 of the objectives by teacher criteria measure and 3 of the objectives by comparative measure were judged as representing a potential need or a need.

A complete rating of performance is found in the appendix.

Of special interest are the objectives judged as indicating strength on both criteria and comparative measure and the 3 objectives representing need on both comparative and criteria measure. These objectives and representative items are presented on the next pages as special strengths and special needs. The performance percentages are those for the item examples.

Performance percentages for the objective categories are in appendix 2.1, 2.2 and 2.3.

SPECIAL STRENGTHS - NINE-YEAR-OLDS

IA1 The student will demonstrate competency in the recall of basic sums up to 18.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
95.7	90		94.5	

4. Do the following problem:

8 + 5 =

ANSWER ______________

IH The student will demonstrate competency in the recognition of inequality and equality symbols.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
74.6	40		73.7	

6. Match the symbol with its meaning:

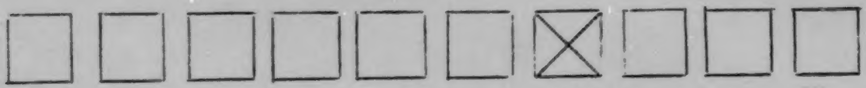
W. ⓐⓑⓒⓓⓔ	add	a.	≠
X. ⓐⓑⓒⓓⓔ	is equal to	b.	>
Y. ⓐⓑⓒⓓⓔ	is less than	c.	<
Z. ⓐⓑⓒⓓⓔ	is greater than	d.	+
		e.	=

SPECIAL STRENGTHS - NINE-YEAR-OLDS

IIC1 The student will demonstrate competency in performing mathematical manipulations in finding the ordinal number.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
95.0	80		92.3	

34. In the picture below, if the square on the left is the first square, the square with the X in it is in what position?



○ fifth

○ sixth

○ seventh

○ eighth

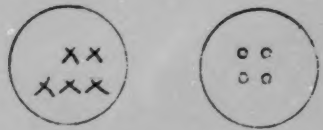
○ I don't know.

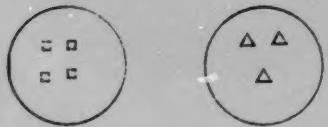
SPECIAL STRENGTHS - NINE-YEAR-OLDS

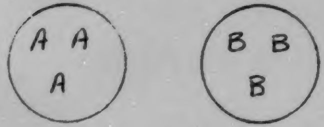
II01 The student will demonstrate competency in distinguishing between pairs of sets which are nonequivalent and those which are equivalent.

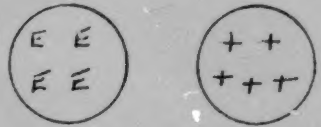
BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
89.2	80		85.2	

42. Which one of the following pairs of sets has the same number of elements (members)?

○ 

○ 

○ 

○ 

○ I don't know.

IIIG1 The student will demonstrate understanding of odd and even numbers by stating whether a given counting number is even or odd.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
79.6	60		76.8	

20. Decide whether each of the following numbers is odd or even and fill in the correct circle.

		odd	even	I don't know.
A.	50	○	○	○
B.	365	○	○	○
C.	28	○	○	○
D.	7	○	○	○
E.	111	○	○	○

IIIL3 The student will demonstrate an understanding of the properties of addition, subtraction and multiplications by correctly indicating one different sum or product of zero and any other number.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
96.2	90		94.3	

21. Do each of the problems below.

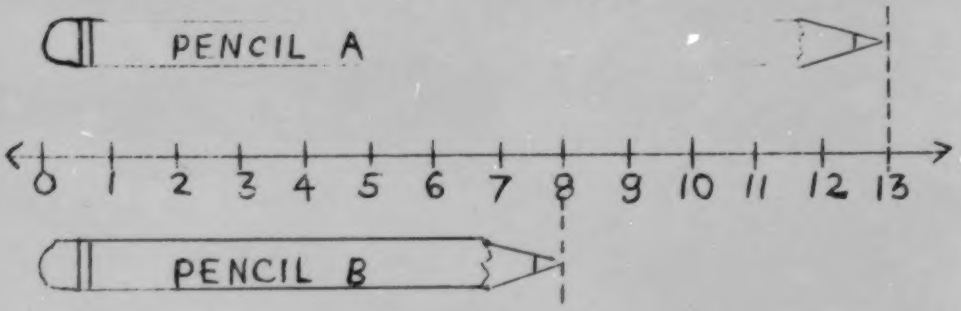
A. 3 + 0 =

A. ANSWER________________

IIIP1 The student will demonstrate an understanding of the concept of subtraction by correctly determining differences between two lengths.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
88.8	80		84.79	

18. Look at the picture below.



How many units shorter is PENCIL B than PENCIL A?

○ 5

○ 8

○ 10

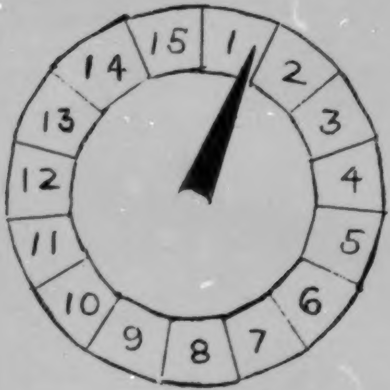
○ 13

○ I don't know.

IIIQ1 The student will demonstrate an understanding of probability.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
79.4	60		73.8	

40. Pete was playing a game with a spinner like this:



The spinner was divided into 15 sections of equal size. Five of these sections were white, two were blue, four were red and four were black. What is the most likely color for the spinner to stop on?

○ White

○ Blue

○ Red

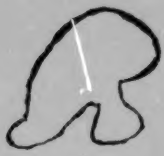
○ Black

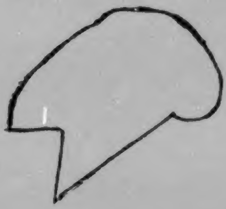
○ I don't know.

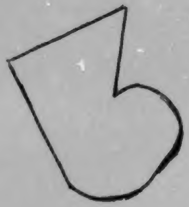
VA12 The student will demonstrate competency in recognizing patterns and making simple generalizations in identifying the common attribute of a set.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
67.5	60		59.2	

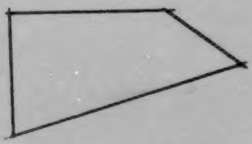
46. Look at the three shapes below:

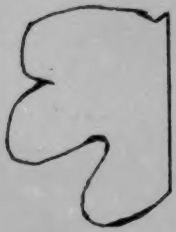


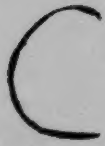


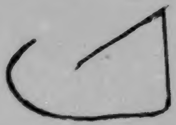


Now select the shape that goes with these three shapes.

○ 

○ 

○ 

○ 

○ I don't know.

SPECIAL STRENGTH - NINE-YEAR-OLDS

VH The student will recognize counter examples in understanding that subtraction is non-commutative.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
59.2	80			54.85

51. When adding, you can reverse the order of the numbers being added and still get the same answer.

For example: 5 + 7 = 12 and 7 + 5 = 12

When subtracting, can you reverse the order of the numbers being subtracted and still get the same answer?

○ yes

○ no

○ I don't know.

IIA4 The student will demonstrate competency in performing mathematical manipulations involving finding the difference between numbers involving regrouping.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
28.5	75		32.4	

37. Do the following subtraction:

$$\begin{array}{r} 1{,}054 \\ -\quad 865 \\ \hline \end{array}$$

ANSWER ______________

III01 The student will demonstrate understanding of mathematical concept of addition by identifying equivalent statements indicating the same sum.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
70.8	85		74.21	

33. Is the following statement true or false?

15 + 3 = 10 + 8

○ True

○ False

○ I don't know.

IVG The student will demonstrate competency in solving problems of determining the distance traveled from two odometer readings.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
41.5	60		48.3	

9. At the start of their trip the odometer on the Smith's car looked like this $\boxed{0}\boxed{7}\boxed{6}\boxed{5}\boxed{4}$. At the end of the trip it looked like this $\boxed{0}\boxed{7}\boxed{7}\boxed{7}\boxed{7}$. How many miles did they travel?

○ 321

○ 654

○ 777

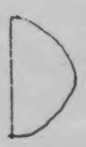
○ 123

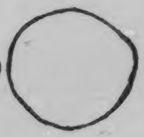
○ I don't know.

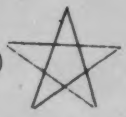
IIL2 The student will demonstrate competency in performing mathematical manipulations by reading a matrix or table.

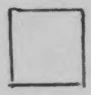
BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
82.3	60		78.5	

11. In the table to the right, which shape is in row B, column 3?

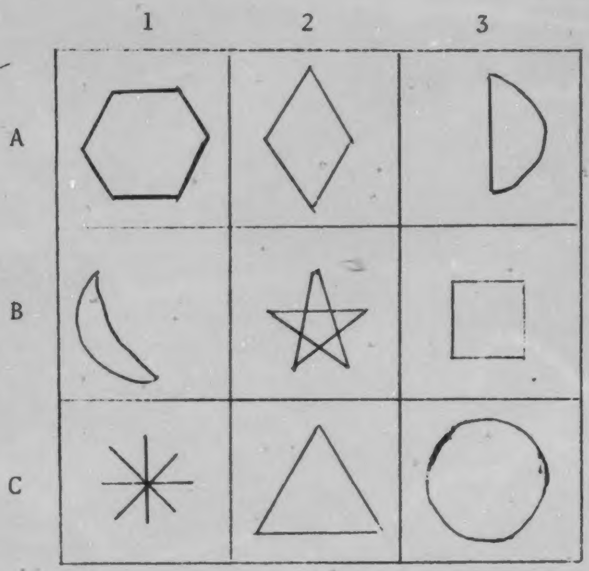
○ 

○ 

○ 

○ 

○ I don't know.



NINE-YEAR-OLD PERFORMANCE SUMMARY

Bloomington 9-year-olds outperform state 9-year-olds in every group of skills, including what the populace generally would consider basic skills. Whereas 96% of the objectives were identified as being at or above an acceptable level, only 4% were identified as needing additional attention. Bloomington 9-year-olds do significantly better, compared to criterion and comparative measures, in the following related objectives-properties of addition, mathematical symbols, concept of odd and even, simple subtraction, ordinal numbers and the 0 principles. The assessment results demonstrated the breadth of the Bloomington mathematics program through significant performance superiority in areas not considered basic to all programs, such as use of a matrix, using concepts of set theory and applying probability theory.

In relation to these same measures, Bloomington teachers recognize that at this age, their students do not perform in an acceptable manner in subtraction involving regrouping (borrowing) and in recognizing equivalent statements.

Even though, by state standards, only 4% of the objectives analyzed are recognized as needing instructional attention, Bloomington staff members have identified these additional 28 objectives as needing increased instructional emphasis because student performance on these objectives did not meet the performance level they expected.

1. Multiplication facts
2. Reading and writing fractions
3. Addition, 2 + 3 digits
4. Addition, 3 or more addends
5. Expanded notation (addition)
6. Multiplication
7. Division
8. Measuring segments
9. Rounding-off
10. Set theory
11. Concept of addition (set theory)
12. Fractions (simple)
13. Addition, number line
14. Subtraction, number line
15. Weight units
16. Subtraction concepts, missing addend
17. Verbal statement to sentence
18. Number sentence selection
19. Word problem
20. Word problem, reasoning
21. Estimation
22. Change
23. Perimeter
24. Measurement differences
25. Extraneous data
26. Ordering fractions
27. Similarities in geometric figures
28. Ordered pairs.

2.3 Student Performance by Objectives - Thirteen-Year-Olds

Summary of Student Performance by Objectives

Table 2.2 below gives a breakdown of the number and percentage of objectives by performance level.

Table 2.2

CLASSIFICATION OF PERFORMANCE ON OBJECTIVES FOR THIRTEEN-YEAR-OLDS

Classification	Teacher Criteria		Comparison to Statewide & Other Similar Performance	
	Number of Objectives	Percent of All Objectives	Number of Objectives	Percent of All Objectives
Strength	25	37	33	49
Potential Strength	10	15	9	13
Acceptable	4	6	11	16
Potential Need	16	24	6	9
Need	12	18	8	12
TOTALS	67	100	67	99

As can be seen in the preceeding table, performance levels for 13-year-old pupils on 39 of the 67 objectives as measured by teacher and on 53 of the 67 objectives as measured by comparative performance were judged to be acceptable or above. A complete rating of performance is found in appendix 2.2.

Of special interest are the 12 objectives judged as strengths both by teacher criteria and by comparative measure and the 2 objectives judged as needs by both measures.

SPECIAL STRENGTHS

IB4 The student will recognize the symbols, % and a/b.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
87.5	40		84.2	

8. In the statement, "Today 20% of the students were absent from school", which one of the following statements best describes the meaning of the symbol %?

ⓐ 20 students were not in school.
ⓑ 20 students out of every 100 students were absent.
ⓒ There were 20 more students in school than were absent.
ⓓ More than 20 students were absent.

ⓔ I don't know.

IC2 The student will recognize definition of polygons, base, altitude, perimeter.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	SIMILAR DISTRICT PERFORMANCE
74.8	20		65.8	67.1

12. Part A. What is the altitude of the triangle below?

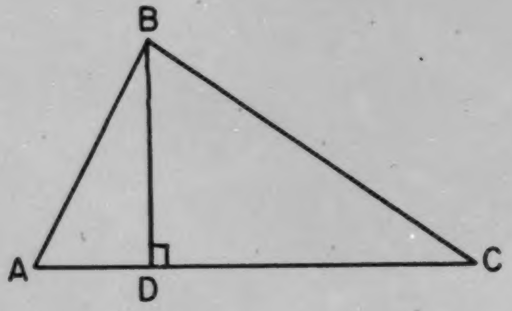
ⓐ $\overline{AB}$

ⓑ $\overline{BC}$

ⓒ $\overline{AC}$

ⓓ $\overline{BD}$

ⓔ I don't know.



Part B. What is the perimeter of the triangle ABC below?

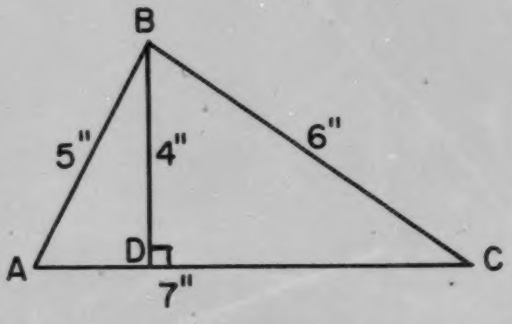
ⓐ 22 inches

ⓑ 18 inches

ⓒ 14 inches

ⓓ 28 inches

ⓔ I don't know.



IE2 The student will demonstrate a knowledge of symbols, =, exponent, >, <, ≠, a.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
89.7	50		89.9	

6. Which of these symbols =, >, <, correctly completes the following sentence:

4 + 3 ______ 3 + 5

ⓐ >
ⓑ =
ⓒ <

ⓓ I don't know.

IF2 The student will demonstrate a knowledge of scientific notation.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA	NATIONAL PERFORMANCE	STATE PERFORMANCE	SIMILAR DISTRICT PERFORMANCE
45.4	20	37.5	36.5	36.5

21. Which one of the following is another way of expressing 3.6×10^2 ?

ⓐ 36
ⓑ 360
ⓒ 3,600
ⓓ 36,000

ⓔ I don't know.

IIA1 The student will perform mathematical manipulations involving the basic operations with whole numbers.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA	NATIONAL PERFORMANCE	STATE PERFORMANCE	
27.6	40	80	81.0	

6. Do the following subtraction:

$$\begin{array}{r} 1{,}054 \\ -\ 865 \\ \hline \end{array}$$

IIF1 The student will perform mathematical manipulations using formulas in real situations.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
64.4	30		60.2	

30. The distance traveled is found by multiplying the rate times the time, or D = R x T. Given that D=45 and R=3, which of the following is T?

ⓐ 48
ⓑ 42
ⓒ 135
ⓓ 15

ⓔ I don't know.

IIIA1 The student will demonstrate a competency in translating a simple verbal statement to an equation or inequality.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
61.4	20		53.9	

35. Which of the following represents the expression, "the sum of a number and 3 times that number is less than 30"?

ⓐ $x + x < 30$
ⓑ $3x - x = 30$
ⓒ $x + 3x < 30$
ⓓ $x + 3x > 30$

⊙ I don't know.

IVA2 The student will demonstrate a competency in solving problems by finding irrelevant data included in a problem.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	SIMILAR SCHOOL PERFORMANCE
79.6	60		77.5	79.4

45. At 20 kilometers an hour, how long will it take a snowmobile that costs $1,050 to travel 150 kilometers? What information, if any, is UNnecessary in the above problem?

ⓐ The speed is 20 kilometers per hour.
ⓑ The snowmobile costs $1,050.
ⓒ The distance traveled is 150 kilometers.
ⓓ None, everything is necessary.

⊙ I don't know.

IVA4 The student will demonstrate competency in solving problems by finding examples that verify a statement.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA	NATIONAL PERFORMANCE	STATE PERFORMANCE	
61.9	60	51.2	55.1	

47. If n is an odd number, what can you say about n + 1?

ⓐ It is always odd.
ⓑ It is always even.
ⓒ It is even or odd depending upon what n is.

ⓓ I don't know.

IVA3 The student will identify the statement of a problem in which there is insufficient data and indicate the needed data.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	SIMILAR SCHOOL PERFORMANCE
95.4	60		91.6	91.8

41. Fred decided to take a trip to his grandmother's house on his mini-bike. It costs Fred 5 cents to run his mini-bike one mile. We want to know how much Fred's trip will cost. What else do we still need to know?

ⓐ How much the mini-bike cost when it was new.
ⓑ How many miles Fred can go on one gallon of gas.
ⓒ How many miles it is to Fred's grandmother's house.
ⓓ How large a mini-bike Fred has.

ⓔ I don't know.

IVA5 The student will demonstrate competency in problem solving by finding examples that contradict a statement.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	SIMILAR SCHOOL PERFORMANCE
60.1	45		57.8	59.2

44. Select the pair of prime numbers which shows that the statement, "The sum of any two prime numbers is divisible by 2" is NOT always true.

ⓐ 11, 13
ⓑ 7, 23
ⓒ 2, 19
ⓓ 5, 41

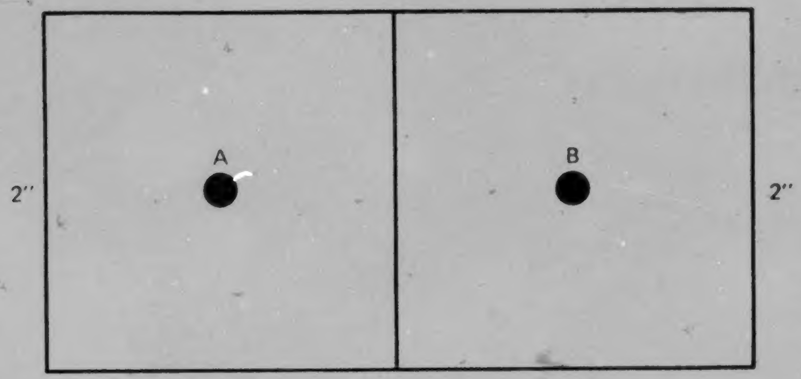
ⓔ I don't know.

VG The student will demonstrate competency in mathematical reasoning by suggesting the relationship between parts of geometric figures.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA	NATIONAL PERFORMANCE	STATE PERFORMANCE	
78.3	30	60.4	73.7	

49. Shown below are two squares. A and B are the centers of the squares. What is the distance in inches from A to B?

ANSWER ______________



40

SPECIAL NEEDS

IIA7 The student will be able to perform mathematical manipulations involving rounding off numerals to the nearest ten, hundred or thousand.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	SIMILAR SCHOOL PERFORMANCE
55.0	50		57.0	56.4

24. Select the true statement.

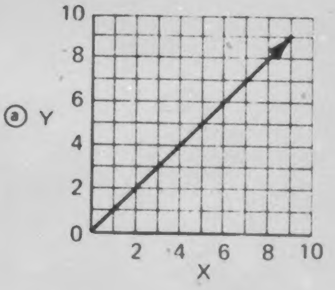
ⓐ 4507 rounded to the nearest tens is 4500.
ⓑ 4507 rounded to the nearest thousands is 5000.
ⓒ 4507 rounded to the nearest hundreds is 4600.
ⓓ 4507 rounded to the nearest thousands is 4000.

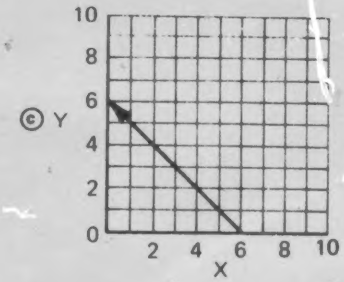
ⓔ I don't know.

IIIH2 The student will demonstrate competency in understanding mathematical processes by illustrating a linear relationship with a graph for the formula.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA	NATIONAL PERFORMANCE	STATE PERFORMANCE	SIMILAR SCHOOL PERFORMANCE
31.6	40	13.3	17.9	19.8

43. Which chart shows part of the graph of the equation x = y?





THIRTEEN-YEAR-OLD PERFORMANCE SUMMARY

The comparison of Bloomington 13-year-olds performance with the performance of 13-year-olds in similar districts in Minnesota shows that of the 67 comparison objectives analyzed, Bloomington 13-year-olds scored significantly above their counterparts in 28% of these objectives and significantly below on 6% of these objectives. Overall, Bloomington student performance significantly exceeded that of their suburban counterparts.

Statewide results showed a greater difference in performance of Bloomington 13-year-olds. They out-performed their counterparts in 39% of the 67 comparison objectives, and fell below on only 3% of the objectives. The performance of Bloomington students significantly exceeded that of their statewide counterparts.

Even though by state standards only 3% of the 13-year-old objectives analyzed are recognized as needing instructional attention, Bloomington staff members identified these 14 objectives as probably needing instructional emphasis. These objectives were rated as important objectives and student performance on these objectives did not meet the minimum performance level expected by teachers.

- Recognize diameter, radius and circumference of a circle.(IC3)
- Knowledge of metric prefixes - kilo, hecto, deca, centi, milli, deci. (ID2)
- Select definitions of integer, prime number, divisibility & square root. (IG2)
- Compare with decimals (IIA2)
- Compute with fractions (IIA3)
- Convert repeating decimals to fractions (IIA8)
- Determine greatest common divisor, and lowest common divisor and prime factorization. (IIA9)
- Compute perimeters, areas, volumes based on linear measures. (IID2)
- Given 3 values in a proportion, solve for the fourth. (IIH3)
- Determine the number of combinations and permutations of events. (IIJ4)
- Represent a simple set of data with an appropriate graph. (IIIB1)
- Identify the formula or relationship described in a problem such as d = rt. (IVB1)
- Determine in how many differeent ways you can make totals, such as 4¢, 7¢, 13¢, 19¢, etc. (IVE1)
- Read and interpret a table of data. (IVF1)

2.4 Student Performance by Objectives - Seventeen-Year-Old

Summary of Student Performancy by Objectives

Table below gives a breakdown of the number and percentage of objectives by performance level.

Table 2.3

CLASSIFICATION OF PERFORMANCE ON
OBJECTIVES FOR SEVENTEEN-YEAR-OLDS

Classification	Teacher Criteria		Comparison to Statewide Performance	
	Number of Objectives	Percent of All Objectives	Number of Objectives	Percent of All Objectives
Strength	14	21	32	48
Potential Strength	6	9	1	2
Acceptable	14	21	31	47
Potential Need	7	11	0	0
Need	25	38	3	4
TOTALS	66	100	66	101

As can be seen in the preceeding table, performance levels for 17-year-old on 44 of the 57 objectives were judged as acceptable or above in relationship to teacher expectations. This represents 77% of the objectives. Performance levels of 17-year-old pupils on 53 of the 57 objectives were judged as acceptable or above in relationship to performance statewide. A complete rating of performance is found in appendix 2.3.

SPECIAL STRENGTHS

Of special interest are those objectives judged as strengths or needs on both criteria and comparative measures. These objectives are termed special strengths and special needs.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	SIMILAR SCHOOL PERFORMANCE
60.4	30		55.5	43.0

IC3 The student will demonstrate a competency in knowledge of algebraic symbolism including F(x)> logistics X exponent X.

41. If f(x) = x + 1, what is the value of f(2)?

ANSWER 3

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
76.5	40		75.9	

IE The student will demonstrate a competency in knowledge of terms in algebra such as:

IE1 Variable, linear, quadratic equation, coordinates, ordered pairs, rational and real numbers.

Sample Problem **40.** Fill in the appropriate circle to show whether each of the following is a linear or a quadratic equation.

	Linear	Quadratic	
A.	☒	ⓐ	$6y = 24$
B.	ⓑ	☒	$x^2 + 2x = 6$
C.	ⓒ	☒	$2x^2 + 3xy + y^2 = 24$
D.	☒	ⓓ	$3x + 4y = 18$

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
35.4	10		32.8	

IE2 Function, inverse

Sample Problem

22. Which of the following listed relations in a function?

ⓐ {(-5, 10) (1, -10) (-5, 5) (1, -1)}

ⓑ {(4, -5) (7, 6) (4, 5) (7, -6)}

ⓒ {(2, 1) (2, 2) (3, 3) (4, 4)}

☒ {(5, 3) (9, 7) (2, 0) (8, 6)}

ⓔ I don't know.

IL2 Identification of graphs of parabola, hyperbola, ellipse.

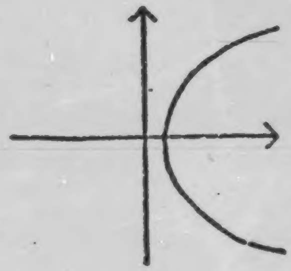
BLOOMINGTON PERFORMANCE	TEACHER CRITERIA	STATE WIDE PERFORMANCE
40.4	10	32.6

43. Match each graph with its correct name from column II.

Column II

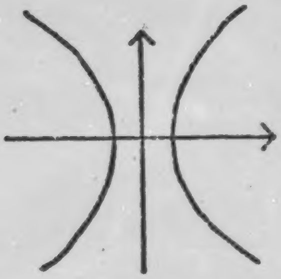
v. circle
w. ellipse
x. hyperbola
y. line
z. parabola

A.



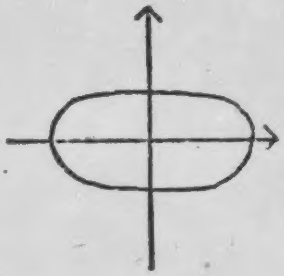
ⓥ ⓦ ⓧ ⓨ [✓ ⓩ]

B.



ⓥ ⓦ [✓ ⓧ] ⓨ ⓩ

C.



ⓥ [✓ ⓦ] ⓧ ⓨ ⓩ

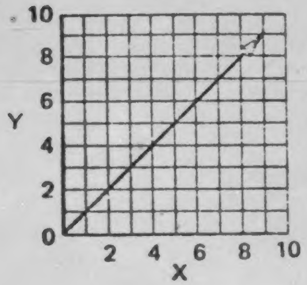
SPECIAL STRENGTHS - SEVENTEEN-YEAR-OLDS

IIIA1 The student will demonstrate competency in the understanding of concepts and processes in graphing linear functions.

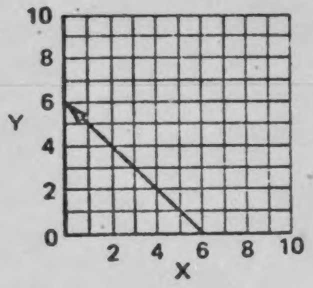
BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA	NATIONAL PERFORMANCE	STATE PERFORMANCE	
63.9	50	48.9	57.9	

42. Which chart shows part of the graph of the equation x = y?

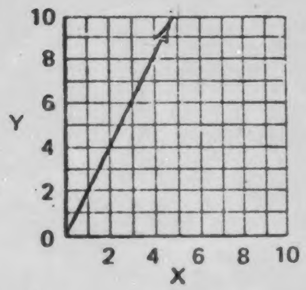
[✓ ⓐ]



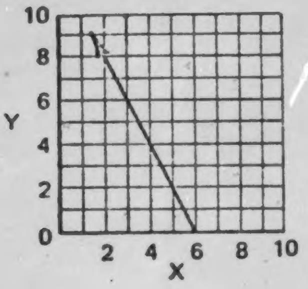
ⓒ



ⓑ



ⓓ



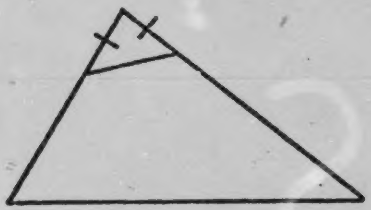
ⓔ I don't know.

IIIL The student will demonstrate competency in illustrating a geometric theorem by making sketches.

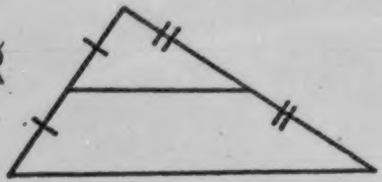
BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
62.3	40		55.6	

29. Which of the following diagrams illustrates the conditions given in the theorem: "The line segment joining the midpoints of two sides of a triangle is parallel to the third side".

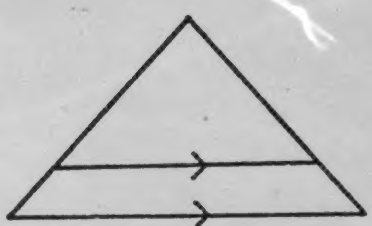
ⓐ



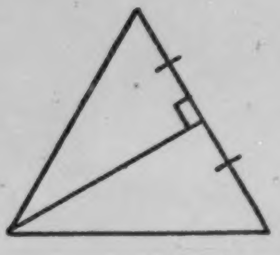
[✓ ⓒ]



ⓑ



ⓓ



⊙ I don't know.

SPECIAL STRENGTHS - SEVENTEEN-YEAR-OLDS

IS Knowledge of necessary and sufficient conditions, converse, inverse, contrapositive and counter example.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA	NATIONAL PERFORMANCE	STATE PERFORMANCE	
56.8	50	51.0	50.1	

14. Which one of the statements below follows logically from the statement, "All good drivers are alert"?

ⓐ All alert persons are good drivers.
ⓑ Some alert persons are not good drivers.
ⓒ A person who is not a good driver is not alert.
ⓓ A person who is not alert is not a good driver.

ⓔ I don't know.

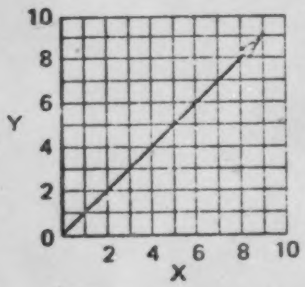
IIIA1 The student will demonstrate competency in the following: make a graph of a linear function.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA	NATIONAL PERFORMANCE	STATE PERFORMANCE	
63.9	50	48.9	57.9	

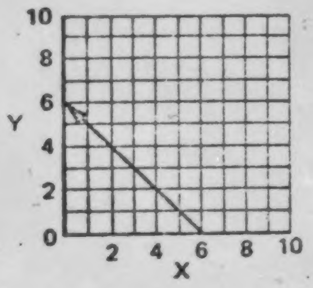
42. Which chart shows part of the graph of the equation $x = y$?

o/o

ⓑ



ⓒ



SPECIAL STRENGTHS - SEVENTEEN-YEAR-OLDS

IVE The student will demonstrate competency in solving mathematical problems involving selection of skills, information and techniques in interpreting tables and graphs.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA	NATIONAL PERFORMANCE	STATE PERFORMANCE	
67.4	50	51.2	59.4	

22. The last five years' batting averages for six baseball players and the average of the team for which they play are shown below:

	1967	1968	1969	1970	1971
Team Average:	.220	.212	.231	.224	.226
Players					
1. Lehmann	.260	.255	.295	.265	.261
2. Finley	.210	.224	.216	.221	.210
3. Hlavaty	.248	.251	.249	.246	.253
4. Heimer	.252	.255	.259	.264	.270
5. Lee	.275	.260	.290	.279	.283
6. Womer	.265	.315	.295	.304	.320

A. Which player had the most CONSISTENT batting average between 1967 and 1971?

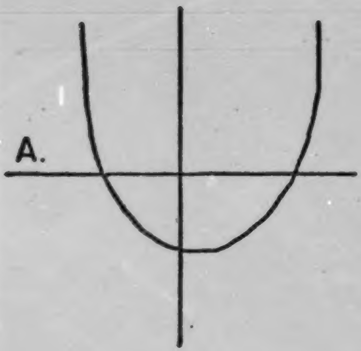
ⓐ Lehmann
ⓑ Finley
[✓ ⓒ Hlavaty]
ⓓ Heimer
ⓔ Lee
ⓕ Womer

ⓖ I don't know.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
45.1	20		37.1	

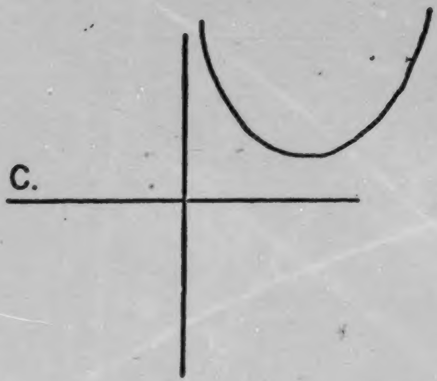
26. For each of the following sketches of the graphs of equations, tell whether the roots (solutions) are real or complex.

A.



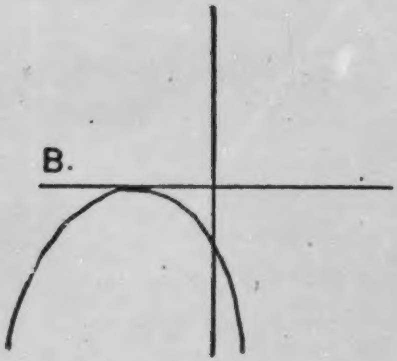
[✓ ⓐ real]
ⓑ complex
ⓒ I don't know.

C.



ⓐ real
[✓ ⓑ complex]
ⓒ I don't know.

B.



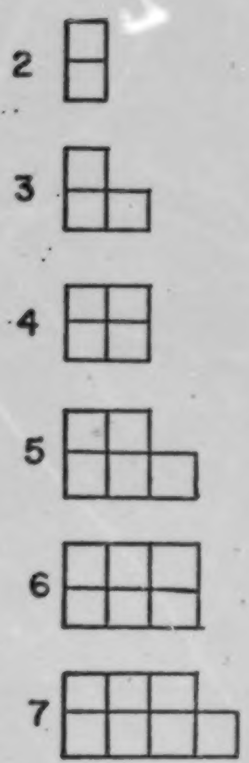
[✓ ⓐ real]
ⓑ complex
ⓒ I don't know.

SPECIAL STRENGTHS - SEVENTEEN-YEAR-OLDS

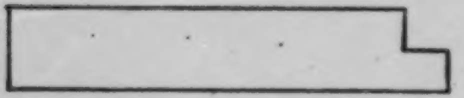
VA The student will demonstrate competency in using mathematics and mathematical reasoning to analyze problems in geometry including drawing figures, making constructional measurements, models and paper folding.

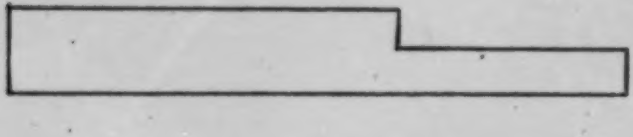
BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
63.5	60		62.9	

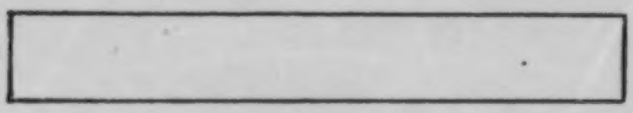
38. If the pattern at the right continues what will the general shape for 273 look like?

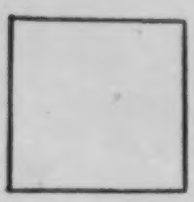


etc.

[✓ ⓐ]


ⓑ


ⓒ


ⓓ


ⓔ I don't know.

VB ...recognizing patterns and making generalizations.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
84.4	40		83.5	

36. The size of a motion picture on the screen is a function of the distance of the projector from the screen. The chart below shows that if the distance between the screen and the projector is 3 units, the size of the picture is 9 square units.

distance from screen	d	1	2	3	4	5	6	7
size of picture	s			9		25		

A. What is the size, in square units, of the picture if the distance between the projector and screen is 7 units?

ⓐ 14
ⓑ 21
ⓒ 35
[✓ ⓓ 49]

ⓔ I don't know.

B. What is the formula for the relationship between d and s?

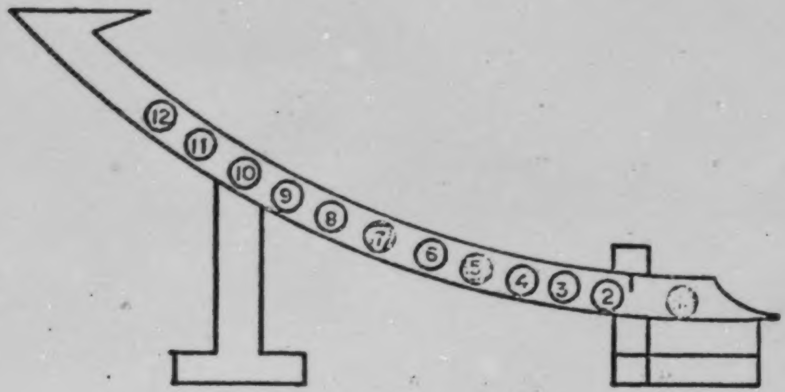
[✓ ⓐ $s = d^2$]
ⓑ $s^2 = d$
ⓒ $s = 3d$
ⓓ $s = 5d$

ⓔ I don't know.

VC The student will demonstrate competency in using mathematical reasoning in solving novel problems, puzzles and recreations.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
65.2	20		61.3	

1 - 56. A long time ago, an old king made a funnel holding white candy pills and black poison pills to help him decide which of his prisoners would die. Only one pill could come out of the funnel at a time. As you can see, a black pill is just about to fall out. Each prisoner had to take out two pills. He had to replace the first pill regardless of color, and he had to swallow the second pill. The picture shows 12 pills ready to be taken by nine prisoners. Pills 1, 5 and 7 are poison. Prisoner A takes pill No. 1 and replaces it at the top, and eats pill No. 2. Then the second prisoner (prisoner B) draws No. 3, replaces it at the top, and eats pill No. 4. Which of the nine prisoners (A, B, C, D, E, F, G, H, I) has to eat one of the poison pills? Fill in the circle next to your answer.

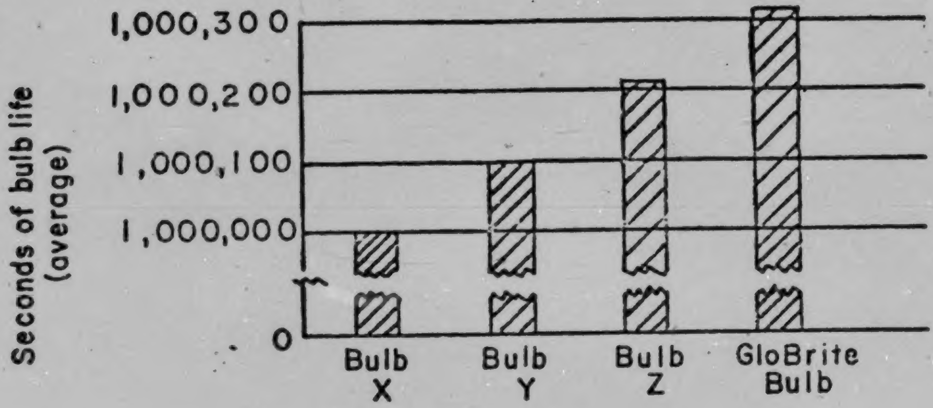


	#	%	
ⓐ A	3	1.30	ⓕ F
ⓑ B	16	6.96	ⓖ G
ⓒ C	150	65.22	ⓗ H
ⓓ D	30	13.04	ⓘ I
ⓔ E			

ⓙ I don't know.

VH The student will demonstrate competency in using mathematical reasoning to discover the fallacy in consumer advertising involving statistical data and graphs.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
58.3	50		53.95	



40. This bar graph appears in an advertisement with the following script:

> "Anyone can see by the graph, which is based on a study done by an independent laboratory, that GloBrite Bulbs last longer than the other 3 leading light bulbs."

Select the statement below which best describes your reaction to this advertisement.

ⓐ That's quite a large difference between the bulbs' lives.
ⓑ Yes, GloBrite Bulbs are really the best buy.
[✓ ⓒ The differences among the four are very slight, if any.]
ⓓ I don't understand the graph.

SPECIAL STRENGTHS - SEVENTEEN-YEAR-OLDS

VP2 The student will demonstrate competency in solving problems using the technique of use of a simpler case.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
39.1	25		35.2	

41. Look at the following problem. [Given a set of six elements, how many subsets of two elements each can you find from the given set.] Which situation below could be solved by the same method?

ⓐ Six children each got two pencils. How many pencils were there?
ⓑ At two hours after six o'clock, what time is it?
[✓ ⓒ How many committees of two can be formed from six people?]
ⓓ Given six horizontal lines and two vertical lines, how many intersections are there?

ⓔ I don't know.

VP3 The student will demonstrate competency in solving problems using the technique of looking at extremes.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
83.4	60		79.4	

33. A manufacturer claims that motor oil brand X is good for your car in any weather. Which of the situations below would give the best data to test this claim?

ⓐ Try brand X at -40°, 0°, and 20°.
ⓑ Try brand X at 70°, 85°, and 100°.
[✓ ⓒ Try brand X at -40°, 40°, and 100°.]
ⓓ Try brand Y at -40°, brand X at 40°, and brand Z at 100°.

ⓔ I don't know.

SPECIAL NEEDS - SEVENTEEN-YEAR-OLDS

Two objectives were judged as needs on both criteria and comparative measures.

IA2 The student will demonstrate proficiency in recognition of percent and ratio.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
27.8	50		41.4	

5. Match each numeral in Column I with the percent it equals in Column II.

	Column I	Column II	
A. ⓐ ⓑ [✓ ⓒ] ⓓ ⓔ ⓕ	.04	a.	.04%
B. ⓐ ⓑ ⓒ [✓ ⓓ] ⓔ ⓕ	.4	b.	.4%
C. ⓐ ⓑ ⓒ ⓓ [✓ ⓔ] ⓕ	4	c.	4%
D. ⓐ [✓ ⓑ] ⓒ ⓓ ⓔ ⓕ	.004	d.	40%
		e.	400%
		f.	4000%

IVM The student will demonstrate competency in solving mathematical problems by locating a flaw in an algebraic proof.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA		STATE PERFORMANCE	
9	10		11.6	

47. The following "proof" that 2 = 1 is obviously not done correctly. Study the "proof" and fill in the oval next to the step in which the mistake is made.

1. suppose that $y = b$
ⓐ 2. multiply by y $y^2 = by$
ⓑ 3. subtract b^2 $y^2 - b^2 = by - b^2$
ⓒ 4. factor $(y - b)(y + b) = b(y - b)$
[✓ ⓓ] 5. divide by (y − b) $y + b = b$
ⓔ 6. substitution since y = b (step 1) $b + b = b$ or $2b = b$
ⓕ 7. divide both sides by b $2 = 1$

ⓖ I don't know.

IVW The student will demonstrate competency in solving mathematical problems involving consumer topics such as budgets, taxes, insurance, checking accounts, etc.

BLOOMINGTON PERFORMANCE	TEACHER MINIMUM CRITERIA	NATIONAL PERFORMANCE	STATE PERFORMANCE	
77	80	82.9	81.1	

42. A man bought two pounds of cheese in eight-ounce packages. How many packages did he buy?

SEVENTEEN-YEAR-OLD PERFORMANCE SUMMARY

Data on the student performance by objectives for 17-year-olds indicates a good overall performance.

Seventy-seven percent of the criterion established by district mathematics instructors, were met or exceeded by this group. Even though this is a good performance on district objectives, twenty-three percent of these objectives demonstrate less than acceptable performance.

Comparing Bloomington students to students across the state also reflects a high performance. Bloomington students ranked lower on only four objectives. These four objectives are: (1) knowledge of the metric system, (2) solving consumer type problems, (3) ratio and percent and (4) locating a flaw in an algebraic proof.

2.5 SUMMARY FOR NINE, THIRTEEN AND SEVENTEEN-YEAR-OLD PERFORMANCE

The performance of Bloomington students within objectives of the mathematics assessment was commendable. By every measure and at every age they had good performance.

The assessment results demonstrated the breadth of the Bloomington mathematics curriculum by the performance superiority students exhibited in areas not considered basic to all programs.

The expectations of Bloomington teachers for mathematics achievement are high. Student performance judged against teacher expectations does suggest areas for improvement.

Objectives where need was judged by both teacher criteria and comparison with performance of other students were for nine-year-olds:

- Subtraction with borrowing and recognizing equivalent statements.

thirteen-year-olds:

- Rounding off numbers to the nearest tenth, hundred or thousand, recognizing the graph of linear equations.

seventeen-year-olds:

- Knowledge of the metric system, solving consumer type problems and locating a flaw in an algebraic proof.

A complete table of student performance by objectives is in appendix 2.1, 2.2 and 2.3

CHAPTER III

ANALYSIS OF MATHEMATICS PERFORMANCE CONTENT BY CLUSTERS AND IN CONTRAST TO CHARACTERISTICS OF STUDENTS

3.1 Introduction

Clusters were developed to classify exercises in terms of content areas and operations across objectives. The definitions and general content incorporated in each cluster are described below for each level.

NINE-YEAR-OLD CLUSTERS (10)

C1: COMPUTATION WITH WHOLE NUMBERS: Recall of basic facts and computation (addition, subtraction, multiplication and division) involving up to three digit numbers.

C2: MATHEMATICAL CONCEPTS AND PROCESSES: Recognition of number properties and operations, the number line, and order relationships.

P1: PROPERTIES OF NUMBERS: Place value, naming numbers (numerals) counting, odd and even numbers.

S1: MATHEMATICAL SYMBOLS AND SETS: Order relationships between numbers and concepts related to sets.

F1: INTRODUCTION TO FRACTIONS: Recognizing the meaning of fractional parts and order among fractions.

G1: RECOGNITION OF GEOMETRIC PROPERTIES: Names and properties of geometric figures, including open and closed curves, lines, and symmetry.

G2: APPLICATIONS OF GEOMETRIC PROPERTIES: Geometric concepts such as length, area and volume are applied to a variety of problem settings.

M1: MEASUREMENT: Recognition of appropriate units of measure for a given situation and applications of measurement systems (Metric, English).

PS1: BASIC PROBLEM SOLVING: Translating verbal statement or representations into math statements.

PS2: LOGIC, EQUATIONS, PATTERNS, GRAPHS, PROBABILITY AND ADVANCED PROBLEM SOLVING: An introduction to logical reasoning, solving simple equations, recognitions of mathematics patterns and graphs. Includes basic ideas of probability and advanced problem solving situations.

THIRTEEN-YEAR-OLD CLUSTERS (15)

C1: Computation With Whole Numbers: Recall of basic facts and computation with up to four place numbers using addition, subtraction, multiplication and division.

C2: Concepts and Computation With Common Fractions: The operations of addition, subtraction, multiplication and division are applied to common fractions. Also included is the recognition of fractional comparisons including ratios.

C3: Concepts and Computation With Decimal Fractions: The operations of addition, subtraction, multiplication and division are applied to decimal fractions. Also included is the recognition of equivalent forms of decimals using percents and common factors.

P1: Properties of Numbers: Place value and ordering of numbers. (Whole numbers and decimal fractions.)

P2: Number Expressions and Factors: Includes scientific notation (powers), number divisibility, prime factors, multiples and divisions.

D1: Recognition of Terms and Symbols: integer, rational prime, odd and even numbers, ratio, sets,square root, order relations.

G1: Recognition of Geometric Properties: Names for shapes; perimeter, area, altitude, diameter, parallel and other commonly used geometric terms.

G2: Applications of Geometric Properties: Using a basic knowledge of area, perimeter, volume and other properties of geometric figures, this knowledge is applied to a given situation. Computation is often required.

A1: Knowledge of Algebraic Expressions: Substitution and translation of verbal statements into algebraic symbolism.

A2: Algebraic Applications: Algebraic symbolism is applied to several situations in determining solutions to equations.

M1: Using Measurement Systems: Knowledge of both the customary (English) and metric systems is applied to common situations. The use of the monetary system is included. Some problems require computation.

I1: Interpreting Graphs, Maps and Pictures: Picture graphs and other presentation of data are to be interpreted and conclusions are drawn.

PS1: Basic Problem Solving: Verbally stated problems require a direct translation into a solution involving only arithmetic computation.

PS2: Patterns, Logic and Advanced Problem Solving: The recognition of a number pattern, drawing conclusions, and more advanced problem situations.

MM1: Metric Measurement: Recognition of definitions and applications of the metric system of measurement.

SEVENTEEN-YEAR-OLD CLUSTERS (15)

C1: Computation with Whole Numbers: Basic facts and addition, subtraction, multiplication, division and taking square roots.

C2: The Fraction, Concept and Computation with Common Fractions: The concepts of ratio and equivalent fractions; addition, subtraction, multiplication and division with common fractions.

C3: Computation with Decimals: Addition, subtraction, multiplication and division with decimals; conversion of decimals to percents and common fractions.

P1: Properties of Numbers: Deals with odd and even numbers, positive and negative numbers, rational numbers and real numbers; also deals with factors, exponents and properties of number systems.

G1: Recognition of Geometric Figures and Relations between Figures: Recognition of angles, polygons, ellipses and parabola; also included are congruence and similarity relations for triangles.

G2: Computing Perimeters, Areas and Volumes: Basic knowledge of area, perimeter, volume and other properties of geometric figures applied to specific situations.

A1: Algebraic Expressions: Involves the knowledge necessary to manipulate algebraic expressions and to solve equations.

A2: Applications of Algebra: The methods of algebra are used in situations requiring the solutions of algebraic equations.

I1: Interpreting Graphs, Tables and Maps: Picture graphs and other representations of data are presented for interpretation and determination of accurate conclusions.

PS1: Basic Problem Solving: Verbally stated problems that can be translated into equation form and then solved by means of simple arithmetic computations.

PS2: Advanced Problems Solving: Recognition and use of the heuristics of problem solving and applying these to problem situations.

M1: Measurement Systems: Use of common units of measurement. The great majority of exercises (six out of seven) deal with a basic knowledge of the metric system.

SP: Statistics and Probability: Deals with basic notions of the probability of an event; also deals with the concepts of mean, mode and median.

S1: Sets: Exercises relate to the general concepts of sets and subsets as well as basic operations on sets.

T1: Trigonometry: Deals with basic knowledge and applications of the sine, cosine, tangent and cotangent functions.

3.2 Student Performance by Content Cluster

Table 3.1 lists percent scores for each cluster by student age for state, Bloomington and similar district students. The asterick * indicates a difference which is significant (not possibly due to chance in 95/100 cases). 13-year-old similar district data was not available.

Table 3.1
PERFORMANCE BY AGE AND CLUSTER
BLOOMINGTON, STATE AND SIMILAR DISTRICTS

Cluster	Age	State	Bloomington	Similar District
C1 Computation with whole numbers	9	65.4	65.8	67.0
	13	86.7	87.7	
	17	91.8	91.8	92.4
C2 Mathematical Concepts				
Number Operations	9	47.1*	50.3	48.5
Fractions	13	39.4*	43.7	
Fractions	17	61.3	59.3	63.4
F1 Introduction-Fraction	9	25.8*	32.7	27.3*
C3 Computation with decimals	13	36.5*	38.9	
	17	51.8*	46.6	53.6
P1 Properties of numbers	9	85.3*	87.3	86.0
	13	55.3	57.0	
	17	61.5*	65.2	65.5
P2 Number Expressions and Factors	13	53.5*	56.7	
S1 Math Symbols and Sets	9	75.4	76.9	75.9
	17	70.9	72.4	73.5
D Recognition of Terms and Symbols	13	55.5	56.5	
G1 Recognition of Geometric Properties	9	72.0	73.9	73.1
	13	69.3	68.8	
	17	61.6*	63.8	64.1
G2 Application of Geometric Properties	9	30.1	32.4	29.9
	13	42.5*	56.7	
	17	52.5	53.7	55.1
A1 Algebraic Expressions	13	56.2	57.8	
	17	49.4	50.1	53.2
A2 Algebraic Applications	13	56.2	57.8	
	17	35.2*	37.7	38.1
I1 Interpreting Graphs	13	69.9*	72.3	
I2 Interpreting Graphs, Maps, Tables	17	51.4*	55.2	55.4
PS1 Basic Problem Solving	9	60.1	61.6	61.5
	13	51.5*	54.8	
	17	63.4	63.4	65.0
PS2 Advanced Problem Solving	9	49.8*	53.6	51.0*
	13	56.0*	50.8	46.7
	17	44.8	46.2	
MM1 Metric Measurement	13	50.0*	55.7	
		58.4	55.8	59.6
M1 Measurement	17	46.7*	50.2	47.5*
		55.8*	58.4	59.6
SP Statistics Probability	17	25.1	25.1	26.5
T1 Trigonometry	17	19.7	22.0	21.3
TOTALS	9	61.9*	64.4	63.1
	13	56.7*	59.1	
	17	53.0	53.9	55.4

Summary of Performance by Cluster - Nine-Year-Old

When Bloomington nine-year-olds are compared to state nine-year-olds, they equal or surpass the state nine-year-olds in 100% of the cluster categories. They significantly outperform their peers on 60% of the categories and overall perform significantly better than their nine-year-old peers.

Summary of Performance by Cluster - Thirteen-Year-Old

When Bloomington thirteen-year-olds are compared to state thirteen-year-olds, they equal or surpass the state thirteen-year-olds in all but one or 93% of the cluster categories. They significantly outperform their peers in 10 of the 15 clusters or 67% of the categories. Overall they perform significantly better than their thirteen-year-old state peers.

Summary of Performance by Cluster - Seventeen-Year-Old

When Bloomington seventeen-year-olds are compared to state seventeen-year-olds they equal or surpass the state seventeen-year-olds in all but three or 80% of the cluster categories. They significantly outperform their peers in 5 of the 16 or 31% of the clusters and overall equal the performance of their seventeen-year-old state peers.

All Students

Bloomington students had commendable performance overall in the clusters of mathematics content.

3.3 Bloomington performance in clusters of mathematics content in contrast to characteristics of pupils.

A pupil questionnaire was answered by pupils participating in the assessment. Five student characteristics from this questionnaire were chosen for analysis.

The student characteristics and their respective questionnaire items were:

GRADE Student participants were defined by age and from different grades. Hypothesis: Higher grade students should perform better because of more instruction.

1. I am in grade ⓐ6 ⓑ7 ⓒ8 ⓓ9

SEX Performance of boys and girls has interest. Hypothesis: Boys will outperform girls.

2. I am a ⓐboy ⓑgirl

PARENTAL SCHOOL DISCUSSIONS

Parent discussion of school may influence achievement. Hypothesis: If more parental discussion-then higher achievement.

6. How often do you and your parents talk about your school work and school activities?
(Fill in only one circle.)

ⓐ Never or hardly ever
ⓑ Once or twice a month
ⓒ Once or twice a week
ⓓ Just about every day

STUDENT ATTITUDE TOWARD MATHEMATICS

Mathematics may be liked as a subject. Hypothesis: Students who like mathematics will have higher performance or higher performing students will like mathematics.

24. Compared to the other subjects you have studied in school, which of the following statements best describes your feelings about math?
(Fill in only one circle.)

ⓐMath is my least favorite subject.
ⓑMath is not included among my favorite subjects.
ⓒMath is included among my favorite subjects.
ⓓMath is my most favorite subject.

SOCIO-ECONOMIC STATUS

Employment level of parents reflects the socio-economic status of the student. Hypothesis: Higher socio-economic level students will show higher achievement.

5. How much school did your father and mother complete?
(Fill in only one circle for each parent.)

	Father	Mother	
A.	ⓐ	ⓐ	Did not complete the 8th grade
B.	ⓑ	ⓑ	Completed the 8th grade but did not go to high school
C.	ⓒ	ⓒ	Went to high school but did not graduate from high school
D.	ⓓ	ⓓ	Graduated from high school
E.	ⓔ	ⓔ	Some education after graduation from high school
F.	ⓕ	ⓕ	Graduated from college
G.	ⓖ	ⓖ	Has an advanced degree (Masters or Doctorate)
H.	ⓗ	ⓗ	I don't know.

7. From the list to the right, pick the type of work which comes closest to your father's main job, and fill in the circle with the corresponding letter in the column headed "Father." Then pick the type of work which comes closest to your mother's main job, and fill in the circle with the corresponding letter in the column headed "Mother."

Please fill in only one circle in each column. If your father or mother has more than one job, fill in the circle with the letter corresponding to his or her MAIN job at this time.

Father	Mother	
ⓐ	ⓐ	SEMI–SKILLED WORKER: factory worker, farm worker, bus driver, truck driver, gardener, mine worker, waiter or waitress, gas station attendant, cook, maid, taxi driver, laborer, custodian
ⓑ	ⓑ	SKILLED CRAFTSMAN OR FOREMAN: carpenter, mechanic, plumber, electrician, policeman, draftsman, technician, barber or beautician, seamstress, practical nurse
ⓒ	ⓒ	OFFICE OR SALES CLERK: bank or store clerk, bookkeeper, mail clerk, office worker, secretary, telephone operator, mailman
ⓓ	ⓓ	PROFESSIONAL: teacher, doctor, engineer, lawyer, social worker, public accountant, musician, dentist, writer, registered nurse, military
ⓔ	ⓔ	MANAGER OR OWNER: farm owner or operator, business owner, store or office manager, banker, government official, administrator, real estate or insurance agent, or other sales persons
ⓕ	ⓕ	HOMEMAKER (Stays at home)
ⓖ	ⓖ	UNEMPLOYED
ⓗ	ⓗ	DECEASED
ⓘ	ⓘ	I don't know.

Results for each age group are presented in comprehensive charts with performance in each cluster compared to student characteristics in appendix 3.1, 3.2 and 3.3. Results by age groups indicate the following;

NINE-YEAR-OLD

Most of the nine-year-olds selected for assessment were fourth graders (407-Grade 4, 142-Grade 3). Bloomington nine-year-olds in grade four significantly outperformed their nine-year-old counterparts in grade three on all clusters, averaging a 12% gain and gaining as much as 20% in computation skills involving whole numbers.

Girls (271) and boys(276) were numerically about equal in the nine-year-old sample. Girls perform better in using mathematical symbols and sets. They also scored significantly better in recognizing simple geometric properties. However, boys do better in application of geometric properties. Boys outperform girls in the area of measurement. Overall the boy and girl performance levels are nearly equal.

Most Bloomington nine-year-olds in the sample (365) feel mathematics is their most favorable subject. Those students who consider mathematics their favorite subject achieve significantly greater success than those who do not consider mathematics one of their favorite subjects.

The largest number of students in the sample were classed as middle socio-economic class (280) as contrasted with high (192) and low (34). Achievement was significantly better overall and in 100% of the individual analysis categories for students in middle or high socio-economic status.

TABLE 3.1

CHARACTERISTICS OF BLOOMINGTON 9-YEAR-OLDS (N=550)

		NUMBER	PERCENTAGE
Grade	Three	142	25.8%*
	Four	407	74.0
Sex	Male	276	50.1
	Female	271	49.2
Parental Discussion	Never	89	16.2
	Seldom	61	11.1
	Occasionally	109	19.8
	Often	288	52.4
Attitude Toward Mathematics	Negative	71	12.9
	Neutral	114	20.7
	Positive	365	66.4
Pupil Socio-Economic Status	Low	34	6.2
	Middle	280	50.9
	High	192	34.9

* (Percentages do not always total to 100 per cent, due to students not responding to the question.)

THIRTEEN-YEAR-OLD

The larger group of the sample were eighth graders (679) but some were in seventh grade (143). Bloomington thirteen-year-olds who are eighth graders consistently outperform thirteen-year-olds who are seventh graders. Both groups outperform their state peers.

Approximately equal numbers of boys (413) and girls (405) took the tests. Bloomington boy and girl performances were nearly equal and both significantly exceeded their respective state levels.

Many thirteen-year-olds (368) listed mathematics as their favorite subject while slightly fewer saw it as not among their favorite (338) and some as their least favorite (117).

Students who listed mathematics as their favorite subject outperformed students who listed mathematics as their least favorite subject by a margin of 12% to 23% in each cluster.

The largest group of those students tested (492) were classed as middle socio-economic status as contrasted with high (265) and low (63). Students with a high socio-economic background outperformed students with a low socio-economic background by an average of 12% in each cluster.

TABLE 3.2
CHARACTERISTICS OF BLOOMINGTON 13-YEAR-OLDS (N=826)

		NUMBER	PERCENTAGE
Grade	Seven	143	17.3% *
	Eight	679	82.2
Sex	Male	413	50.0
	Female	405	49.0
Parental Discussion	Never	65	7.9
	Seldom	94	11.4
	Occasionally	255	30.9
	Often	412	49.9
Attitude Toward Mathematics	Negative	117	14.2
	Neutral	338	40.9
	Positive	368	44.6
Pupil Socio-Economic Status	Low	63	7.6
	Middle	492	59.6
	High	265	32.1

* (Percentages do not always tatal to 100 per cent, due to students not responding to the question.)

SEVENTEEN-YEAR-OLD

The largest group of the sample were eleventh graders (522) but some were tenth graders (24) and twelfth graders (96). Bloomington twelfth grade students tested outperformed eleventh grade students and both twelfth and eleventh grade students outperformed Bloomington 17-year-olds.

Approximately equal numbers of 17-year-old boys and girls took the tests. Bloomington boy and girl performances were nearly equal. Neither boys nor girls from Bloomington have performance significantly different from their respective state performance levels.

Most 17-year-old students tested listed mathematics as not among their favorite subjects. Students listing mathematics as their favorite outperformed those listing it as their least favorite (40.00 - 68.38).

The largest group of 17-year-old students tested (280) were classed as middle socio-economic status (S.E.S.) as contrasted with high (192) and low (34). Students with high socio-economic classification outperformed students with low socio-economic classification by an average of 13% overall.

TABLE 3.3

CHARACTERISTICS OF BLOOMINGTON 17-YEAR-OLDS (N=642)

		NUMBER	PERCENTAGE
Grade	Ten	24	3.7
	Eleven	522	81.3
	Twelve	96	15.0
Sex	Male	305	47.5
	Female	333	51.9
Parental Discussion	Seldom	105	16.4
	Occasionally	204	31.8
	Often	266	41.4
Attitude Toward Mathematics	Negative	143	22.3
	Neutral	303	47.2
	Positive	190	29.6
Pupil Socio-Economic Status	Low	45	7.0
	Middle	362	56.4
	High	231	36.0
Years in High School Mathematics	0	120	18.7
	1	193	30.1
	2	236	36.8
	3	74	11.5
	No Response	19	3.0
Years in Vocational/Technichal Courses	0	334	52.0
	1	148	23.1
	2	92	14.3
	3	63	9.8

3.4 Summary of Bloomington Performance

The most successful Bloomington mathematics student is either a boy or girl whose parents discuss school work at home. This boy or girl likes mathematics and has continued to take mathematics in high school.

The least successful Bloomington mathematics student is a boy or girl who almost never discusses school work at home, who has had only the minimum account of mathematics, who doesn't like math and comes from a low socio-economic classification.

A Bloomington 9 or 13-year-old will likely be found to have better mathematics understanding and skills than a 9 or 13-year-old from most any other place. A Bloomington 17-year-old is likely to have about the same mathematics skills and knowledge as a 17-year-old from any other place.

CHAPTER IV

ANALYSIS OF BLOOMINGTON PERFORMANCE BY ITEMS IN COMPARISON WITH MINNESOTA AND THE NATION

4.1 Introduction

This chapter contains descriptions of the contrasts in Bloomington performance with mathematics performance of analogous groups in Minnesota and the nation. The use of national assessment items within the Minnesota assessment made these comparisons possible.

The major purpose of this chapter is to compare Bloomington students mathematics performance with that of students in Minnesota and the nation. Complete tables of these comparisons are in appendix 4.1, 4.2 and 4.3.

4.2 Performance by item for 9, 13 and 17-year-olds

Table 4.1 presents Bloomington 9, 13 and 17-year-old performance on comparison items. Number and percentage of objectives are listed where Bloomington performance was significantly above, significantly below, or had no difference in contrast to the comparison group. Significance here refers to the criteria that such difference would not occur by chance in 95 of 100 cases.

Bloomington Performance by % of items

		Significantly Above	No Difference	Significantly Below
Bloomington vs Minnesota	9	38.7	58.1	3.2
	13	38.8	57.4	3.7
	17	7.3	83.6	9.1
Bloomington vs Minnesota Suburbs	9	29.0	61.3	9.7
	13	24.0	70.3	5.5
	17	0.0	81.8	18.2
Bloomington vs U.S.	9	71.0	22.5	6.5
	13	68.5	29.6	1.8
	17	29.1	65.4	5.5
Bloomington vs U.S. Suburbs	9	29.0	64.5	6.5
	13	29.6	68.5	1.8
	17	14.6	83.6	1.8

4.3 Summary

Bloomington 9 and 13-year-olds performed as well or better than their state, state suburb, nation and nation suburb counterparts on over 90% of the comparison items.

Bloomington 13-year-olds outperformed all groups in items dealing with scientific notation, solving simple algebraic equations and inequalities, simple probability, graphic linear equations and geometric relations. In their areas of their poorest performance, use of terminology and use of symbols, the performance of Bloomington 13-year-olds was still equal to that of their statewide peers.

Bloomington 17-year-olds performed as well or better than their state, state suburb, nation and nation suburb counterparts on over 80% of the comparison items. Bloomington 17-year-olds did not significantly outperform their peers in other Minnesota suburbs.

CHAPTER V

ANALYSIS OF GROWTH OF BLOOMINGTON STUDENT PERFORMANCE BY SIMILAR TEST ITEM RESULTS BETWEEN AGES 9, 13 and 17-YEAR-OLDS

5.1 Introduction

To measure the growth in mathematics skills and understanding between the ages of 9, 13 and 17, some identical items were used in testing each age level. Some of these "overlap" items were used at all three levels. Overlap performance is presented here in tables and verbal summaries in three groupings:

(1) 9, 13 and 17-year-olds overlap
(2) 9 and 13-year-olds overlap
(3) 13 and 17-year-olds overlap

5.2 Overlap performance

Table 5.1 presents the overlap performance of 9, 13 and 17-year-old students. Bloomington students improve performance with increased age in every one of the 15 items. The largest gains in performance are in multiplication, division, word problems, geometry and algebra. These are areas attended to by instruction. Bloomington 9, 13 and 17-year-old performance growth follows a pattern similar to that of state students. However, Bloomington students often perform higher than the state students as 9 and 13-year-olds but at 17-year-olds perform lower.

Table 5.2 presents overlap performance of 9 and 13-year-old students. Nine-year-old students and thirteen-year-old students were tested on 17 identical items encompassing each of the 10 categories that were analyzed. On each of these items gains ranged from 4.1% on place value (students were at the 90% level) to 57% on word problem solutions, averaging overall a 28% gain.

Table 5.3 presents the overlap performance of 13 and 17-year-old students on 61 items. Bloomington students show growth between 13 and 17-year-old performance on nearly every item tested. Large gains in performance by 17-year-olds are in items using algebra skills and geometry concepts On items testing knowledge of metrics, 13-year-olds outperform 17-year-olds. 13-year-olds also show superior performance on fraction problems, including multiplications of fractions and fractions of a circle.

Multiplications of fractions and fractions of a circle

Performance growth between 13 and 17-year-olds for Bloomington students does not keep pace. Bloomington 13-year-olds are seen exceeding state 13-year-olds performance. Bloomington 17-year-olds are seen just matching it or slightly behind.

5.3 Summary

Growth in mathematics knowledge and skills is evident in the analysis of overlap item performance.

The nine-year-old difficulty with subtraction was completely eliminated by age 13 as evidenced by a 59.1% gain in accuracy.

Gains are found in every area with these exceptions:

- Seventeen-year-olds exhibit less knowledge of metrics than thirteen-year-olds.
- Seventeen-year-olds demonstrate less facility with multiplication of fractions and identifying fractional parts.

OVERLAP ITEMS

TABLE 5.1

(Ages 9, 13 & 17)

Age	Package & Item	State Performance	District Performance	
9	2-5	92.5	91.7	
13	3-4	97.3	97.1	12 - 7 = ____
17	2-4	97.8	98.2	
9	1-5	58.2	61.9	
13	2-4	97.9	93.2	9 x 3 =
17	1-5	98.5	98.7	
9	1-36A	83.9	85.0	
13	2-11A	95.5	94.3	$\begin{array}{r}38\\ +\ 19\\ \hline\end{array}$
17	1-12A	97.3	95.7	
9	1-36B	64.8	65.2	
13	2-11B	91.2	88.3	$\begin{array}{r}36\\ -\ 19\\ \hline\end{array}$
17	1-12B	93.3	93.0	
9	2-49	35.9	44.8	
13	2-11C	87.1	85.8	$\begin{array}{r}38\\ \times\ 9\\ \hline\end{array}$
17	1-12C	89.8	86.1	

Age	Package & Item	State Performance	District Performance	
9	2-37	32.4	28.5	
13	1-6	81.0	87.6	$\begin{array}{r}1054\\ -.\ \ 865\\ \hline\end{array}$
17	2-37	90.9	92.4	
9	2-24	50.3	56.7	
13	3-5	91.8	89.8	Division $48 \div 8 =$
17	3-4	93.4	91.9	
9	2-23	14.0	11.6	
13	3-27	15.4	18.2	$\frac{x}{y}$ is doubled
17	1-52	43.1	42.6	
9	1-43	50.3	51.3	
13	1-36	85.4	83.7	Checking subtraction
17	3-43	92.7	92.8	
9	1-30	57.1	63.4	
13	2-26	88.8	88.3	$x - 3 = 7$ What is x?
17	2-42	94.9	93.3	

OVERLAP ITEMS

TABLE 5.1

(Ages 9, 13 & 17)

Age	Package & Item	State Performance	District Performance	
9	2-41	25.7	33.9	Word problem
13	3-37	78.9	75.6	
17	2-41	91.1	92.8	
9	1-11	26.6	35.2	Perimeter of a triangle
13	1-12B	57.3	64.2	
17	3-10B	78.6	80.2	
9	2-31	23.6	26.4	Word problem
13	3-45	77.5	80.4	
17	2-17	90.7	93.3	
9	1-35	73.1	75.5	Word problem - missing information
13	1-41	91.6	95.4	
17	1-14	95.8	95.7	
9	1-10	2.6	3.7	Which fraction is largest?
13	1-25	30.7	37.6	
17	1-7	54.4	60.0	

Age	Package & Item	State Performance	District Performance	
9				
13				
17				
9				
13				
17				
9				
13				
17				
9				
13				
17				
9				
13				
17				

OVERLAP ITEMS

Table 5.2

(Ages 9 & 13)

Age	Package & Item	State Performance	District Performance	
9	1-4	93.7	91.6	
13	1-4	97.9	97.2	8 + 5 =
17				
9	1-8	78.0	80.4	
13	3-8	91.1	92.4	Geometric Terms
17				
9	2-10	60.8	54.2	
13	1-9	92.6	94.3	Geometry
17				
9	2-36	77.7	73.3	Reading Measuring
13	2-23	97.3	96.4	Instruments
17				
9	1-24	15.1	22.3	Subtraction
13	1-15	76.3	77.7	Non-commutative
17				

Age	Package & Item	State Performance	District Performance	
9	1-15A	91.3	90.8	
13	3-23A	99.0	99.3	Interpreting Graphs
17				
9	1-15B	73.6	72.9	
13	3-23B	94.4	95.6	Interpreting Graphs
17				
9	1-15C	89.9	90.1	
13	3-23C	99.1	100.0	Interpreting Graphs
17				
9	2-43	84.5	85.6	
13	2-5	93.2	89.7	Place Value
17				
9	1-46	27.9	24.9	Solving Word
13	2-39	80.3	81.9	Problems
17				

OVERLAP ITEMS

Table 5.2

(Ages 9 & 13)

Age	Package & Item	State Performance	District Performance	
9	1-49	27.3	28.6	
13	1-42	68.8	70.2	Problem Solving
17				
9	2-17A	40.7	40.4	
13	3-41A	86.0	86.2	Problem Solving
17				
9	2-17B	50.8	56.0	
13	3-41B	81.7	84.4	Problem Solving
17				
9	1-45	51.8	51.3	Area and Volume
13	3-46	90.9	90.9	Block and Crate
17				
9	2-12	11.7	10.8	Perimeter
13	1-33	52.4	54.6	
17				

Age	Package & Item	State Performance	District Performance	
9	2-50	61.4	70.0	
13	1-13	83.1	87.2	Number Series
17				
9	2-32	45.9	54.2	
13	2-49	73.7	78.3	Geometry
17				
9				
13				
17				
9				
13				
17				
9				
13				
17				

O V E R L A P   I T E M S

TABLE 5.3

(Ages 13 & 17)

Age	Package & Item	State Performance	District Performance	
9				
13	3-35A	22.1	15.6	Percentage and Decimals
17	2-5A	39.7	27.8	
9				
13	3-35B	31.3	28.7	Percentage and Decimals
17	2-5B	46.9	40.8	
9				
13	3-35C	22.4	17.8	Percentage and Decimals
17	2-5C	38.9	26.5	
9				
13	3-35D	20.6	13.8	Percentage and Decimals
17	2-5D	32.6	21.1	
9				
13	2-29	29.2	28.1	Fractions & Decimals
17	1-6	49.1	47.8	

Age	Package & Item	State Performance	District Performance	
9				
13	2-14	70.9	69.8	Exponents
17	3-29	90.4	91.9	
9				
13	3-22	13.9	29.5	Zero exponent $4^0 =$
17	1-28	26.5	29.6	
9				
13	1-16	32.7	34.8	Identify Rationals
17	3-5	50.8	55.9	
9				
13	2-7A	58.9	50.8	Identify Point
17	1-9A	79.9	83.0	
9				
13	2-7B	61.6	53.4	Identify segment
17	1-9B	77.4	82.6	

OVERLAP ITEMS

TABLE 5.3

(Ages 13 & 17)

Age	Package & Item	State Performance	District Performance	
9				
13	2-7C	81.4	77.2	Identify angle
17	1-9C	93.7	92.6	
9				
13	2-7D	83.8	89.7	Identify polygon
17	1-9D	94.0	94.4	
9				
13	3-12	53.5	52.0	Horizontal lines
17	2-36	64.6	63.2	
9				
13	1-10A	63.5	59.2	Identify Octagon
17	3-45A	82.6	79.7	
9				
13	1-10B	58.2	55.7	Identify hexagon
17	3-45B	78.5	77.5	

Age	Package & Item	State Performance	District Performance	
9				
13	1-10C	98.6	98.2	Identify triangle
17	3-45C	98.4	97.8	
9				
13	1-10D	95.8	95.0	Identify square
17	3-45D	96.9	96.4	
9				
13	1-29	21.2	30.1	Probability
17	1-19	37.3	33.5	
9				
13	1-21	36.5	45.4	Scientific notation
17	2-48	71.1	72.7	
9				
13	2-10A	34.6	43.4	Metric volume unit
17	2-8A	56.6	56.1	

OVERLAP ITEMS

TABLE 5.3

(Ages 13 & 17)

Age	Package & Item	State Performance	District Performance	
9				
13	2-10B	49.7	61.9	Metric mass unit
17	2-8C	68.3	61.9	
9				
13	3-25A	66.6	72.7	Metric prefix milli
17	3-8A	72.7	65.3	
9				
13	3-25B	51.3	56.0	Metric prefix kilo
17	3-8B	57.3	46.0	
9				
13	3-25C	73.9	77.1	Metric prefix centi
17	3-8C	78.5	72.1	
9				
13	2-21	63.7	65.1	Set - subset
17	1-38	78.7	81.3	

Age	Package & Item	State Performance	District Performance	
9				
13	3-38	52.7	49.1	Set union
17	2-38	61.3	58.7	
9				
13	2-11D	91.0	95.0	Division $5\overline{)125}$
17	1-12D	95.7	95.3	
9				
13	3-14	83.1	88.4	1,973 + 201 + 49 =
17	3-18	87.2	89.6	
9				
13	1-7	64.7	71.6	$12\overline{)9864}$
17	2-20	82.2	81.6	
9				
13	2-12	44.6	55.9	14.2 + 3.8 + 43 + .07 =
17	1-17	78.0	78.3	

O V E R L A P   I T E M S

TABLE 5.3

(Ages 13 & 17)

Age	Package & Item	State Performance	District Performance	
9				
13	1-8	46.9	53.9	43.1 x .05 =
17	2-21	71.6	71.3	
9				
13	2-13	37.7	43.1	16.4 ÷ .04 =
17	3-19	54.7	50.0	
9				
13	1-22	64.4	71.3	Meaning of fraction
17	3-20	82.7	77.5	
9				
13	3-6	44.5	58.9	½ + 1/3
17	2-12	71.4	69.5	
9				
13	2-24	72.1	74.4	½ x ¼
17	3-46	70.5	64.0	

Age	Package & Item	State Performance	District Performance	
9				
13	1-18	52.8	44.0	2/7 + ? = 1
17	3-12	66.6	62.6	
9				
13	1-5	36.2	48.2	3½ ÷ 2 =
17	1-26	63.8	60.4	
9				
13	2-28	23.5	21.7	Fraction closest to 3/16
17	2-30	51.2	51.1	
9				
13	1-11	23.9	26.6	Least common divisor
17	3-7	41.3	45.1	
9				
13	2-15	79.0	84.3	Factors of 12
17	1-20	82.7	86.5	

OVERLAP ITEMS

TABLE 5.3

(Ages 13 & 17)

Age	Package & Item	State Performance	District Performance	
9				
13	2-25	35.8	44.1	$a * b = a(a+b)$ then $2 * 3 =$
17	3-39	72.7	69.4	
9				
13	1-45	22.1	28.4	metric units
17	2-35	32.2	35.0	
9				
13	2-46	14.8	16.0	Word problem - rates
17	1-24	27.6	31.3	
9				
13	1-30	41.7	39.7	Square root of 16
17	2-9	83.2	83.9	
9				
13	1-34	48.9	50.7	Map scale
17	2-14	73.0	71.3	

Age	Package & Item	State Performance	District Performance	
9				
13	3-42	58.6	63.6	Shortest route on map
17	3-40	77.6	69.4	
9				
13	2-27	21.3	27.0	Area of polygons
17	1-32	55.3	57.8	
9				
13	2-30	60.2	64.4	Distance = rate x time
17	1-18	84.3	79.1	
9				
13	1-46	52.6	62.8	Volume of solid
17	2-44	77.6	80.7	
9				
13	3-32	45.0	62.2	$3x - 3 = 12 \quad x = \_\_\_$
17	1-11	84.6	75.7	

OVERLAP ITEMS

TABLE 5.3

(Ages 13 & 17)

Age	Package & Item	State Performance	District Performance	
9				
13	1-27	59.2	62.8	$x < 4$ then $x + 7$ is
17	3-9	73.1	76.6	
9				
13	3-29	16.1	28.7	Solve: $\frac{12}{26} = \frac{18}{n}$
17	2-52	46.2	44.8	
9				
13	3-18	58.1	60.7	$a + 3 = b$ $3 + c = b$
17	1-29	83.0	87.0	then ______
9				
13	3-43	17.9	31.6	Graph of $x = y$
17	1-42	57.9	63.9	
9				
13	2-37	23.8	20.3	Binary numbers
17	3-35	37.5	47.3	

Age	Package & Item	State Performance	District Performance	
9				
13	2-47	55.1	61.9	n is odd
17	1-15	83.8	87.0	$n + 1$ is ?
9				
13	1-28	12.5	17.7	Y dollars shared with
17	2-27	64.0	62.8	4 is ____
9				
13	3-30	20.7	16.4	Algebra word problem
17	1-37	62.2	62.6	
9				
13	2-38	55.4	53.4	Perimeter formula
17	3-31	76.4	66.2	
9				
13	2-42	65.3	71.5	Time = $\frac{\text{distance}}{\text{rate}}$
17	3-25	82.1	79.7	

OVERLAP ITEMS

TABLE 5,3

(Ages 13 & 17)

Age	Package & Item	State Performance	District Performance	
9				
13	2-43	9.1	10.7	Area of square given - perimeter
17	3-6	28.2	26.6	
9				
13	1-49	67.0	73.8	Fraction of circle
17	2-54	77.7	70.0	
9				
13	3-47	24.7	30.6	Area and shape
17	2-13	43.7	48.9	
9				
13	1-44	38.8	38.7	How much wallpaper?
17	1-39	67.4	66.1	
9				
13	3-36	47.5	53.8	Temperatures 31 and -7. Difference?
17	3-48	76.9	82.4	

Age	Package & Item	State Performance	District Performance	
9				
13	1-38	54.6	64.2	1" water = 9" snow 1,602" snow = ______
17	1-10	79.2	77.4	
9				
13	1-39	11.9	18.4	"A" gets 70% of votes 4,200 votes total
17	3-51	48.2	46.4	"A" gets ______
9				
13	1-48	32.1	43.3	Most volume 1" cube, sphere,
17	2-11	54.6	57.4	cylinder, pyramid
9				
13	2-44	20.2	33.1	Number sequence
17	2-26	38.3	45.3	
9				
13	2-48	26.4	32.4	Price per ounce
17	1-31	37.3	39.1	

OVERLAP ITEMS

TABLE 5.3

(Ages 13 & 17)

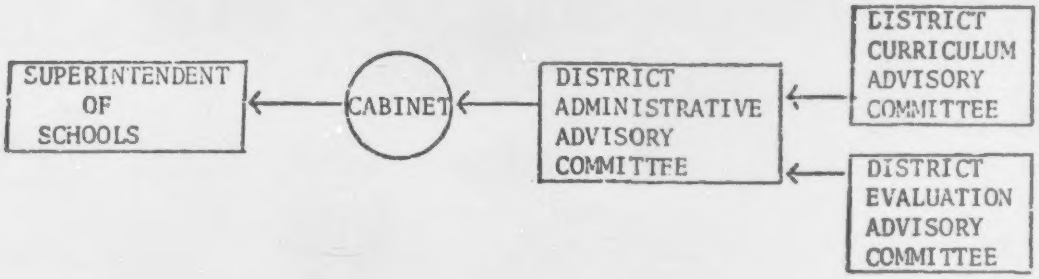
Age	Package & Item	State Performance	District Performance	
9				
13	2-41	59.9	61.6	Contrary proof by example.
17	1-51	80.4	75.7	
9				
13				
17				
9				
13				
17				
9				
13				
17				
9				
13				
17				

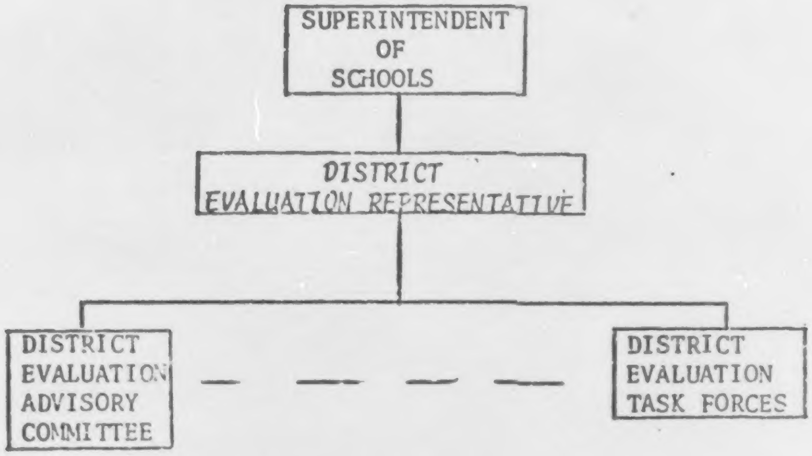
Age	Package & Item	State Performance	District Performance	
9				
13				
17				
9				
13				
17				
9				
13				
17				
9				
13				
17				
9				
13				
17				

OPERATING PROCEDURES
FOR
DISTRICT EVALUATION ADVISORY COMMITTEE

I. RELATIONSHIPS

This is an advisory committee at the district level in the area of district evaluation for public reporting. In this relationship, the committee makes recommendations for policy and procedures & recommends appropriate task forces to complete assigned functions.


SUPERINTENDENT OF SCHOOLS
CABINET
DISTRICT ADMINISTRATIVE ADVISORY COMMITTEE
DISTRICT CURRICULUM ADVISORY COMMITTEE
DISTRICT EVALUATION ADVISORY COMMITTEE


SUPERINTENDENT OF SCHOOLS
DISTRICT EVALUATION REPRESENTATIVE
DISTRICT EVALUATION ADVISORY COMMITTEE
DISTRICT EVALUATION TASK FORCES

II. MEMBERSHIP

Total membership should be such that the total committee is less than 15.

A. The membership of the DEAC shall comprise the following:

1 District Evaluation Representative
2 Elementary Principals
2 Secondary Principals
4 Elementary Teachers
4 Secondary Teachers
1 Special Education Representative

B. Appointment to Membership

1. Principal members of the DEAC shall be appointed by their respective Assistant Superintendent.

2. The Special Education representative shall be recommended by the Director of Special Education.

3. Teacher members of the committee shall be

   2 - Elementary Instructional Advisory Committee members
   2 - Secondary Instructional Advisory Committee members
   2 - District Curriculum Advisory Committee members
   1 - Elementary teacher at large
   1 - Secondary teacher at large

   Recommendation should be made by April. Appointment should be made by the end of May.

4. Teacher members of the DEAC shall be appointed by their respective Assistant Superintendent from a list of recommended nominees.

C. Term of Office

The term of office for each member shall be three years with approximately 1/3 of the members replaced each year.

D. Leadership

1. The District Evaluation representative shall chair the regular meetings of DEAC.

2. The District Evaluation representative shall appoint a committee member to assume the leadership role in cases of absence.

III. FUNCTIONS

A. Review, evaluate and recommend revision of district Position Statement on evaluation.

B. Review, evaluate and recommend district-wide curriculum evaluation areas and develop procedures for their conduct.

IV. MEETINGS

The regular meeting of the DEAC shall be held on the third Wednesday of designated months of the school year. Meeting hours shall be from 8:00 a.m. to 11:30 a.m. There shall be approximately 6 meetings per year. Special meetings shall be called at the discretion of the chairperson.

Necessary teacher substitutes shall be budgeted through the District Evaluation budget.

V. REPORTING

A copy of the minutes of each meeting of DEAC shall be distributed to:
- The superintendent of schools
- Assistant superintendents
- District directors
- The chairpersons of District & Division Administrative Advisory Councils for members of these councils
- The chairpersons of the Elementary & Secondary Instructional Advisory Committees for members of those committees
- The chairperson of the District Curriculum Advisory Committee for distribution to members of that committee.

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

9-Year-Olds Mathematics
1974-75

KEY

PS	Potential Strength
S	Strength
A	Acceptable
PN	Potential Need
N	Need

	Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
			Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
(1)	IA1	93.7	85	100	85	S	A		93.73	93.91
(2)	1-4	91.6	80	100	90				92.97	
	2-4	95.7	90	100	80				94.48	
	IA2:2-5	92.0	90	100	80	A	A		92.45	93.0
	IA3:1-5	61.9	70	90	70	PN	S		58.23	59.7
	ID1	82.7	88.3	98.3	88.3	N	A		82.14	82.8
	1-6A	97.1	90	100	90				96.60	
	B	93.8	90	100	90				93.92	
	C	93.8	90	100	90				91.64	
	D	93.0	90	100	90				91.71	
	E	91.6	90	100	90				91.45	
	2-14	26.4	80	90	80				27.51	
	TE2:1-41	98.0	100	100	90	A	A		97.56	97.8

(1) Represents total for each objective, i.e. IA1 (which includes 1-4 and 2-4).

(2) Represents totals for each item, i.e., 1-4 (Package #1, Item #4) and 2-4 (Package #2, Item #4).

* Represents significant difference.

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

9-Year-Olds Mathematics
1974-75

		Criterion Measures			Need, Potential Need, Potential Strength, Strength		Comparative Measures		
Objective and Item	Student Performance	Minimal Acceptable Outcome	Desired Outcome	Teachers' Predicted Outcome	By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Pert.
IG1	81.2	72.1	87.9	77.1	PS	A		82.07	81.2
1-8	80.6	60	90	70			74.03 *	78.00	80.35
1-32A	90.5	55	60	70				85.21	
B	—	80	100	90	- Poor question -			—	
2-29A	86.3	90	100	95				88.02	
B	79.8	85	100	85				80.19	
C	80.5	75	95	70				79.40	
2-10	54.2	60	70	60			48.37	60.81	61.74*
IH	74.6	40	50	30	S	A		73.67	74.07
2-6A	91.7	40	50	30				92.29	
B	86.6	40	50	30				86.77	
C	61.7	40	50	30				59.09	
D	58.5	40	50	30				56.53	
IIA1	78.0	83.3	96.7	76.7	PN	A		77.62	79.10
1-36A	85.0	90	100	80			79.00*	83.92	85.56
B	65.2	90	100	70			55.03*	64.78	67.56
2-9	83.8	70	90	80				84.16	

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

9-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IIA2	64.9	80	92.5	70	N	A		64.18	66.02
2-19	66.4	80	90	70				64.89	
1-33	63.4	80	95	70				63.47	
IIA3	49.4	60	80	65	N	A		50.72	51.06
1-7	59.0	60	80	70				63.64	
2-22	39.7	60	80	60				37.79	
IIA4	56.4	87.5	95	75	N	N		59.58*	59.84*
1-16	84.3	100	100	90				86.77	
2 37	28.5	75	90	60			27.17	32.39	32.62
IIB1	58.3	75	87.5	67.5	N	S		52.52*	56.34*
1-25	71.8	90	100	80				69.16	
2-49	44.8	60	75	55			25.23*	35.88	40.09
IIB2	34.2	70	90	65	N	S		28.81*	31.63*
2-24	56.7	70	90	70				50.34	
1-13	11.7	70	90	60				7.27	

NEEDS AND STRENGTHS AS DETERMINED BY
CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

9-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures: Minimal Acceptable Outcome	Criterion Measures: Desired Outcome	Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength: By Criterion Measures	Need, Potential Need, Potential Strength, Strength: By Comparative Measures	Comparative Measures: National Perf.	Comparative Measures: State Perf.	Comparative Measures: Similar State Dist. Perf.
IIC1:2-34	95.0	80	95	75	S	S		92.33*	93.22
IIE:2-23	11.6	40	40	20	*A	*A	14.96	14.04	13.62
IIH1	63.8	70	85	62.5	PN	A		61.80	61.24
2-36	73.3	85	95	75				77.73	
2-32	54.2	55	75	50			36.16*	45.87	46.12
II I1	87.2	88.8	100	85	A	A		86.85	87.70
1-15A	90.8	90	100	80			88.55	91.31	92.43
B	72.9	90	100	80			60.60*	73.59	74.16
C	90.1	90	100	90			84.29*	89.93	91.24
2-27	95.0	85	100	90				92.57	
IIK1:1-26	38.1	70	90	70	N	S		32.65*	33.81
IIL2:2-11	82.6	60	80	70	S	S		78.54*	82.55
II01:2-42	89.2	80	90	80	S	S		85.24*	84.90*
II02:1-17	86.5	90	100	80	PN	A		85.72*	86.49
II03:2-8	67.5	40	50	50	S	A		66.25	66.34
II05:1-28	70.0	65	85	60	S	A		71.19	72.20
IIIA1:2-43	85.6	90	100	75	*A	A	75.21*	84.46	85.28

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

9-Year-Olds Mathematics
1974-75

		Criterion Measures			Need, Potential Need, Potential Strength, Strength		Comparative Measures		
Objective and Item	Student Performance	Minimal Acceptable Outcome	Desired Outcome	Teachers' Predicted Outcome	By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IIIA2:1-31	86.8	75	95	80	PS	S	74.25*	83.46	84.07
IIIB1	80.5	90	100	80	N	S		76.12*	77.34
1-22A	79.5	90	100	80				73.81	
B	77.7	90	100	80				74.71	
C	84.3	90	100	80				79.80	
IIIB2	80.2	70	95	75	PS	A		79.66	80.91
2-7	84.5	60	90	70				84.14	
1-37	75.8	80	100	80				75.18	
IIIC1	77.7	75	95	72.5	A	S		72.93*	73.53*
2-39	80.9	75	100	75			73.29*	74.75*	75.57*
1-34	74.4	75	90	70				71.10	
IIID1	45.2	72.5	95	68.8	N	S		34.55*	36.81*
1-14A	42.9	80	100	80			30.80*	32.64*	34.87*
B	45.8	80	90	70			31.30*	33.69*	36.25*
2-38A	41.5	65	95	65			30.80*	30.27*	33.16*
B	50.5	65	95	60			31.30*	41.60*	43.22*

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

9-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IIIE1:2-25	60.7	60	90	70	PN	S		48.44*	52.97*
IIIE2:1-38	36.6	60	75	60	N	S		31.45	35.36
IIIF1:1-30	51.7	80	100	35	N	S		44.99*	47.75
IIIF2:2-13	10.8	80	90	10	N	A		11.79	11.55
IIIG1	79.6	60	80	70	S	S		76.84*	77.72
2-20A	66.8	60	80	70				69.23	
B	76.2	60	80	70				74.39	
C	78.3	60	80	70				73.45	
D	93.1	60	80	70				88.79	
E	83.4	60	80	70				78.36	
III 11	72.2	72.5	90	70	A	S		67.54*	68.30*
1-43	51.3	65	90	60				50.26	
2-15	93.1	80	90	80				84.82	
III 12:1-30	63.4	85	100	75	N	S	49.15*	57.07*	58.20
IIIK	63.1	67.5	85	65	N	A		61.31	60.11
2-35	62.5	75	90	70				62.10	
1-18	63.7	60	80	60				60.51	
IIIL1:2-30	26.4	80	95	65	*A	A		25.15	28.80
IIIL2:1-50	73.6	60	90	55	PS	A		72.89	75.04

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

9-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IIIL3	96.2	100	100	90	S	S		94.26*	94.78
1-21A	97.4	100	100	90			94.26*	98.20	97.88
B	94.1	100	100	90			81.49*	90.12	92.56
C	97.1	100	100	90			87.76*	94.46	93.89*
IIIM1:1-20	80.6	80	100	80	A	S		75.30*	75.52
IIIN1	64.1	77.5	95	67.5	N	A		63.57	63.93
1-42	46.9	70	90	60				45.54	
2-44	81.2	85	100	75				81.59	
IIIO1:2-33	70.8	85	95	85	N	N		74.21	76.27*
IIIP1:2-18	88.8	80	90	70	S	S		84.79*	86.47
IIIQ1:2-40	79.4	60	80	55	S	S		73.82*	74.98
IIIQ3:1-44	53.5	35	60	30	S	A		52.70	53.26
IVA1	42.2	73.5	90	61.3	N	S		39.40*	42.15
1-46	24.9	65	90	55			31.05*	27.91	30.44*
2-16	56.0	80	90	60			46.04*	53.30	57.99
1-40	53.9	75	90	65			37.14*	50.70	54.59
2-41	33.9	70	90	65			35.15*	25.70*	35.15*

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

9-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IVA2	45.4	55	75	45	N	A		43.75	46.77
2-47	54.5	15	100	65			50.41	55.26	57.47*
1-48	36.3	35	50	25				32.24	
IVA3	22.9	50	60	25	*PN	A		22.34	21.88
2-26	31.8	60	70	30				25.96	
1-12	13.9	40	50	20				18.72	
IVB1	29.1	62.5	70	52.5	N	S		26.43	28.77
1-49	28.6	65	85	60			30.57*	27.30	29.66*
2-28	29.6	60	75	45				25.55	
IVC1	48.2	90	100	70	N	S		45.72	48.23
2-17A	40.4	90	100	70				40.68	
B	56.0	90	100	70				50.76	
IVE	51.3	50	65	45	A	A		51.84	53.48
1-45	51.3	50	65	45			48.32	51.84	53.48

NEEDS AND STRENGTHS AS DETERMINED BY
CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

9-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures: Minimal Acceptable Outcome	Criterion Measures: Desired Outcome	Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength: By Criterion Measures	Need, Potential Need, Potential Strength, Strength: By Comparative Measures	Comparative Measures: National Perf.	Comparative Measures: State Perf.	Comparative Measures: Similar State Dist. Perf.
IVF	23.0	50	70	40	N	A		19.16*	18.11*
2-12	10.8	70	90	50				11.68	
1-11	35.2	30	50	30				26.63	
IVG:1-9	47.0	60	90	50	N	N		48.25	49.45
IVJ1:2-31	26.9	60	75	45	PN	A		23.60	23.72
IVJ2:1-35	75.5	70	85	55	PS	A		73.14	74.99
VA1:2-48	85.2	85	100	75	A	S		78.55*	73.91*
VA2:1-27	79.5	75	95	75	PS	S		72.77*	73.80*
VA3:1-47	82.1	65	90	65	S	A		81.95	84.83
VA4:1-10	3.7	50	60	40	N	A	3.22	2.57	2.54
VA6	39.2	45	60	30	*A	S		34.62*	35.39*
2-50	70.0	50	70	40				61.64	
1-23	8.4	40	50	20				7.59	
VA7:2-21	36.1	60	70	50	N	S		30.07*	30.52*
VA10:1-29	59.7	55	80	60	A	A		58.37	59.42
VA11:2-45	35.4	65	85	65	N	S		30.95	29.99

NEEDS AND STRENGTHS AS DETERMINED BY
CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

9-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
VA12	70.8	60	65	57.5	S	S		66.23	67.77
1-19	74.0	60	50	50				73.29	
2-46	67.5	60	80	65				59.17	
VH1: 2-51	59.2	80	100	80	+A	S		54.85	58.21
1-24	22.3	30	50	20			14.65*	15.08*	17.10*
Total	64.36							61.92*	

+Objective is judged as a double strength or double need.

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

13-Year-Olds Mathematics
1974-75

KEY

PS	Potential Strength
S	Strength
A	Acceptable
PN	Potential Need
N	Need

	Objective and Item	Student Performance	Criterion Measures: Minimal Acceptable Outcome	Criterion Measures: Desired Outcome	Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength: By Criterion Measures	Need, Potential Need, Potential Strength, Strength: By Comparative Measures	Comparative Measures: National Perf.	Comparative Measures: State Perf.	Comparative Measures: Similar State Dist. Perf.
(1)	IA1	94.3	83	98	90	PS	A		95.3	95.7*
(2)	1-4	97.2	70	90	90				97.9	
	2-4	93.2	70	100	80				94.0	
	3-4	97.1	100	100	100				97.3	
	3-5	89.8	90	100	90				91.8	
	IB2:1-16	34.8	10	20	10	S	A		32.7	34.1
	IB3	63.8	60	80	60	PN	S		57.9*	61.0
	3-19A	65.5	60	80	60				56.9	
	B	65.8							60.6	
	C	60.0							56.1	
	IB4:2-8	87.5	40	60	40	S	S		84.2	87.3
	IC1	69.6	42	62	43	S	N		72.0*	73.4*
	1-9	94.3	60	80	70				92.6	
	2-7A	50.8	40	60	40				58.9	
	B	53.4							61.6	
	C	77.2							81.4	
	D	89.7							83.8	
	3-12	52.0	30	50	30				53.5	
	IC2	74.8	20	40	30	S	S		65.8*	67.1*
	1-12A	85.4	20	40	30				74.3	
		64.2							57.3	

(1) Represents total for each objective, i.e. IA1 (which includes 1-4 and 2-4).
(2) Represents totals for each item, i.e., 1-4 (Package #1, Item #4) and 2-4 (Package #2, Item #4).
* Represents significant difference.

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

13- Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IC3	53.7	55	70	55	PN	A		53.8	54.4
3-10	94.2	50	70	50			68.0*	70.9	
2-19	33.1	60	70	60			36.0	36.6	
IC6	71.4	38	57	38	S	N		72.7	73.2
3-8	92.4	70	80	70				91.1	
1-10A	59.2							63.5	
B	56.7	30	50	30				58.2	
C	98.2							98.6	
D	95.0							95.8	
2-18	26.7	40	60	40				29.2	
ID1	65.0	50	70	47	PS	S		56.6*	58.8*
1-14	89.7	50	70	60				85.6	
2-10A	43.4	50	70	40				34.6	
B	61.9	50	70	40				49.7	
ID2	68.6	70	90	60	N	S		63.9*	67.1
3-25A	72.7							66.6	
B	56.0	70	90	60				51.3	
C	77.1							73.9	
ID3:1-15	77.7	40	60	50	S	A	68.7*	76.3	78.5
IE2	67.5	50	65	50	S	S		64.0*	66.5
2-14	69.8	50	60	40				70.9	
3-22	29.5	50	70	40				13.9	
2-6	89.7	50	70	60				89.9	
1-17	80.9	50	60	60				81.1	

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON
13-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
1F1:2-5	89.7	80	90	90	S	N		93.2	93.5
1F2:1-21	45.4	20	30	20	S	S	37.5*	36.5*	36.5*
1G1	78.0	40	55	45	S	A		78.1	79.0
2-15	84.3	50	70	50				79.0	
1-23	71.6	30	40	40				77.1	
IG2	47.3	45	63	48	PN	A		48.2	48.0
2-9	65.5	50	80	70			58.4	72.6	
1-30	39.7	10	20	10			37.3	41.7	
3-21	33.1	60	80	50				26.1	
3-17	50.9	60	70	60				52.5	
IH2	42.7	38	40	36	PS	A		43.2	45.6*
2-21	65.1	50	50	50			58.3	63.7	
3-38	49.1	50	60	70			42.8	52.7	
1-19A	37.2	30	30	20				35.4	
B	40.4							38.4	
C	21.6							25.9	
IIA1	85.3	69	85	68	S	S		83.1*	83.9
2-11A	94.3	80	90	70			94.3	95.5	
B	88.3						88.9	91.2	
C	85.8						82.6	87.1	
D	95.0						88.5*	91.0	
1-6	87.6	40	70	50			80.0*	81.0	
3-14	88.4	80	100	90				83.1	
3-15	78.6	80	90	80				76.4	
1- 7	71.6	40	60	50				64.7	
1-36	83.7	60	80	60				85.4	
3-33	80.0	70	90	70			67.1*	75.8	

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON
13-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IIA2	52.0	55	70	48	N	S		42.1*	44.8*
2-12	55.9	70	80	50				44.6	
3-7	54.9	50	70	60				39.3	
1-8	53.9	40	60	40				46.9	
2-13	43.1	60	70	40				37.7	
IIA3	52.2	57	77	60	N	S		46.1*	47.8*
3-6	58.9	60	80	70			41.9*	44.5	
2-24	74.4	70	90	70			62.2*	72.1	
1-18	44.0	50	80	60				52.8	
2-22	42.4	70	90	60				34.8	
3-16	45.1	60	70	60				35.9	
1-5	48.2	30	50	40				36.2	
IIA4	42.1	41	64	41	PN	A		42.1	43.4
1-22	71.3	30	60	50			64.9*	64.4	
3-35A	15.6							22.1	
B	28.7	40	60	30				31.3	
C	17.8							22.4	
D	13.8							20.6	
2-17	48.4	50	70	50				53.1	
3-13	88.0	50	70	60				82.9	
1-20	35.5	40	70	40				34.3	
2-20	60.1	40	70	50				48.0	
IIA6	55.6	63	75	53		S		52.0*	53.7
3-24A	89.8	90	100	80			84.3*	88.7	
B	73.1						51.5*	65.0	
1-25	37.6	30	50	30			26.2*	30.7	
2-28	21.7	40	50	20			18.9	23.5	
IIA7	55.0	50	70	30	PN	N		57.0	56.4

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

13-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IIA8:2-16	17.8	50	60	50	N	PS		15.5	17.0
IIA9	39.3	50	70	55	N	S		37.4	37.7
1-11	26.6	30	50	40			20.9*	23.9	
3-20	52.0	70	90	70				50.9	
IIB1	42.3	40	65	43		S		39.4	39.1*
2-25	44.1	20	40	20			36.0*	35.8	
3-26	70.2	50	80	60				71.2	
1-26	36.5	40	70	40				35.1	
3-27	18.2	50	70	50				15.4	
IIB3	71.1	57	80	60	PS	S		64.3*	64.1*
3-32	62.2	60	80	60			38.9*	45.0	
2-26	88.3	60	80	60			84.6	88.8	
1-27	62.8	50	80	60			50.1*	59.2	
IID1	78.8	55	80	55	PS	PN		80.8	81.7
2-23	96.4	70	90	70				97.3	
3-9	61.1	40	70	40			39.9*	64.2	
IID2	35.1	50	67	43	N	PS		33.9	35.9
1-33	54.6	60	80	50				52.4	
2-27	27.1	40	50	30				21.3	
3-28	23.6	50	70	50				28.0	
IIE1	46.6	45	65	40	PN	PS		43.5	44.0
1-34	50.7	50	70	40			41.6*	48.9	
2-31	42.4	40	60	40				38.1	
IIF1:2-30	64.4	30	50	30	S	S		60.2	60.9

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON
13-Year-Olds Mathematics
1974-75

		Criterion Measures			Need, Potential Need, Potential Strength, Strength		Comparative Measures		
Objective and Item	Student Performance	Minimal Acceptable Outcome	Desired Outcome	Teachers' Predicted Outcome	By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IIG1	95.5	60	85	70	S	A		95.1	95.4
3-23A	99.3							99.0	
B	95.6	60	90	70				94.4	
C	100.0							99.1	
1-31A	97.9							97.6	
B	82.3	60	80	70				83.1	
C	97.9							97.1	
IIH2:2-29	28.1	30	50	30	PN	PN		29.2	25.2
IIH3:3-29	28.7	60	80	50	N	S		16.1*	18.5*
IIJ1:1-29	30.1	40	70	20	PN	S	15.2*	21.2*	22.9*
IIJ2:2-32	14.2	20	30	20		PN	11.2*	15.6	15.8
IIJ4:3-31	29.5	50	70	50	PN	PN	30.0	27.8	29.2
IIIA1	52.3	23	41	21	S	S		50.7	51.7
1-28	17.7	20	40	20			12.32*	12.5	
3-30	16.4	40	60	30				20.7	
2-33A	80.4							79.3	
B	45.9	20	40	20				45.2	
C	87.5							88.5	
D	56.6							54.7	
1-35	61.4	20	30	20				53.9	
IIIB1:2-35	58.0	60	80	70	PN	N	39.0*	60.9	62.9
IIID1	58.0	40	50	35	PS	S		56.4	56.8
2-36	50.5	30	40	30				45.9	
3-34	65.5	50	60	40				66.9	

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

13-Year Olds Mathematics

1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar Perf.
IIIF1:2-37	20.3	30	30	30	PN	PS		23.8	24.8
IIIG1:3-40	31.6	40	60	40	N	PS		22.3*	23.7*
IIIH1:1-37	39.7	30	50	40		S		20.7*	22.9*
IIIH2:3-43	31.6	40	60	40	PN	N	13.3*	17.9*	19.2*
IVA1	53.6	50	75	43	PN	S		49.4*	49.8*
2-34	27.8	40	60	30			20.4*	23.4	
2-39	81.9	60	90	60			71.7*	80.3	
3-36	53.8	50	80	50				47.5	
1-38	64.2	50	80	50			30.8*	54.6	
3-37	75.6	50	70	40			60.0*	78.9	
1-39	18.4	50	70	30			9.6*	11.9	
IVA2:3-45	79.6	60	80	60	S	S		77.5	79.4
IVA3:1-41	95.4	60	80	40	S	S		91.6*	91.8*
IVA4	67.0	55	75	50	PS	S		62.0*	64.5
2-47	61.9	60	80	50			51.2*	55.1	
1-47	72.0	50	70	50				68.8	
IVA5	60.1	45	60	55	S	S		57.8	59.2
3-44	58.6	30	40	50				55.6	
2-41	61.6	60	80	60				59.9	
IVB1:2-38	53.4	50	70	50	PN	N	60.7	55.4	52.5
IVB2	73.5	57	73	53	S	S		67.8*	69.2*
3-18	60.7	50	70	50	S	S	56.6*	58.1	
2-42	71.5	60	70	60			44.1*	65.3	
1-40	88.3	60	80	50			71.3*	79.9	

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON
13-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IVC4:3-49	80.0	20	30	50	S	S		72.0*	75.7
IVD1:1-42	70.2	70	90	60	A	A		68.8	69.3
IVE1	85.3	90	100	90	N	S		83.9	84.1
3-41A	86.2	90	100	90				86.0	
B	84.4							81.7	
IVF1	56.5	60	80	53	N	S		51.7*	53.2*
1-43A	84.8	60	80	50				78.8	
B	14.9							9.9	
2-40	69.8	60	80	60				66.4	
IVG1	26.7	40	57	37	?	S		24.2*	25.3
2-43	10.7	40	60	30			6.7*	9.1	
3-47	30.6	30	40	30				24.7	
1-44	38.7	50	70	50				38.8	
IVG2:1-46	62.8	50	80	50	PS	S		52.6*	53.5
IV1	32.3	43	60	40	N	PS		29.9	30.2
3-39	52.7	40	50	60			45.6*	52.8	
1-45	28.4	60	80	30				22.1	
2-46	15.7	30	50	30				14.8	
VA1	60.2	30	55	40	S	PS		51.7*	53.8
1-13	87.2	40	70	60				83.1	
2-44	33.1	20	40	20				20.2	
VB1:1-32	60.3	50	70	40	PS	PN		61.2	62.3
VB4:2-48	32.4	40	70	30	N	PS	24.5*	26.4	26.6

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

13-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
VD1:3-11	64.7	30	60	30	S	PN		65.4	63.8
VD4-3-42	63.6	50	70	50	PS	S		58.6	59.1
VE2:2-45	80.4	50	70	40	S	A		80.1	81.4
VF	28.1	25	45	40	PS	PS		26.0	25.8
2-50	20.6	30	50	50				21.6	
1-50	35.5	20	40	30				30.3	
VG	62.1	34	56	38	S	S		56.0*	57.2*
1-48	43.3	30	50	20			28.6*	32.1	
2-49	78.3	30	50	50			60.4*	73.7	
1-49	73.8	10	30	10				67.0	
3-46	90.9	60	90	70			83.0*	90.9	
3-50	24.0	40	60	40				16.2	
VH:3-48	39.6	20	50	40	S	N		29.5*	66.6*

Appendix 2.3

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON
17-Year-Olds Mathematics
1974-75

KEY

PS	Potential Strenght
S	Strength
A	Acceptable
PN	Potential Need
N	Need

	Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
			Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
(1)	IA1	96.4	87	93	83	S	A		96.57	96.16
(2)	1-5	98.7	90	90	90				98.49	
	2-4	98.2	90	90	90				97.79	
	3-4	91.9	80	100	70				93.41	
	IA2	32.8	52	78	52	N	N		41.43*	43.30*
	2-5A	27.8	50	80	50				39.71	
	B	40.8	50	80	50				46.90	
	C	26.5	50	80	50				38.85	
	D	21.1	50	80	50				32.59	
	1-6	47.8	60	70	60				49.11	

(1) Represents totals for each objective, i.e. IA1 (which includes 1-5, and 2-4, and 3-4).

(2) Represents totals for each item, i.e., 1-5 (Package #1, Item #5), and 2-4 (Package #2, Item #4), and (Package #3, Item #4).

* Represents significant difference.

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON
17-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IC3	50.8	30	43	25	S	S		46.69*	49.96
3-29	91.9	50	70	40			43.02	90.37	58.18
1-28	29.6	30	50	30				26.45	
3-41	60.4	30	40	20				55.50	
2-39	21.1	10	10	10				14.45	
IE1	66.7	36	54	34	S	S		62.48*	66.77
3-5	55.9	30	40	30				50.80	
1-40A	76.5	40	60	40				75.98	
B	66.5	40	60	40				63.85	
C	73.9	40	60	40				74.10	
D	62.2	40	60	40				64.73	
3-15	82.0	50	80	40				69.01	
2-28	50.2	10	20	10				38.88	
IE2	42.9	15	20	15	S	S		39.07	42.32
2-22	35.4	10	10	10				32.79	
1-53	50.4	20	30	20				45.35	
IF1	78.4	56	81	60	S	A		77.06	78.77
1-9A	83.0	10	20	20				79.86	
B	82.6	10	20	20				77.38	
C	92.6	10	20	20				93.66	
D	94.4	10	20	20				93.96	
2-36	63.2	50	70	40				64.57	
3-27A	71.6	50	70	30				73.73	
B	61.3	50	70	30				56.23	

* IF1		60	90	80
		60	90	80
		60	90	80
		60	90	80
		60	90	80
		60	90	80

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON
17-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IF2	87.9	73	88	68	S	A		89.11	
3-45A	79.7	60	80	50				82.61	
B	77.5	60	80	50				78.47	
C	97.8	80	90	80				98.41	
D	96.4	90	100	90				96.94	
IG1:1-27	69.0	30	60	30	S	A		65.86	69.02
IG2	22.5	20	30	20	A	A		21.03	22.97
3-49A	21.2	20	30	20				19.91	
B	23.4	20	30	20				21.17	
C	23.0	20	30	20				22.01	
I I	26.7	30	50	20	PN	A		23.66*	25.35
1-33	25.7	20	30	20				23.36	
2-53	25.6	30	50	10				18.11	
3-22	28.8	40	70	30				29.51	
IJ	37.8	37	53	37	A	A		37.54*	40.99
2-6	56.7	30	50	30			54.87	52.70	59.69
1-25	35.7	50	70	60				37.35	
3-54	21.2	30	40	20				21.66	
IK	41.5	33	53	33	S	A		40.89	45.44
1-23A	51.7	40	70	40				52.26	
B	54.4	40	70	40				57.83	
3-11	18.5	20	20	20				12.59	
IL2	45.0	10	10	13	S	S		36.87*	42.09
2-43A	40.4	10	10	10				32.62	
B	46.2	10	10	10				40.35	
C	47.5	10	10	20				37.52	

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON
17-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IQ: 2-48	72.7	40	50	30	S	A	64.05*	71.09	75.37
IR	66.0	45	90	37	S	N		71.34*	72.24*
1-43	94.8	80	90	80				94.87	
2-8A	56.1	50	90	40				56.59	
B	61.9	50	90	40				68.29	
3-8A	65.3	30	90	20				72.69	
B	46.0	30	90	20				57.34	
C	72.1	30	90	20				78.48	
IS: 3-14	56.8	50	60	30	S	S	51.05	50.91	53.68
IIA	77.8	71	87	60	PS	A		79.70*	80.94*
1-12A	95.7	90	90	90			96.99	97.29	97.28
B	94.1	80	90	90			93.20	93.27	94.66
C	87.6	80	90	80			89.85	89.77	90.19
D	96.2	80	90	90			94.73	95.65	94.65
2-37	92.4	80	90	80			91.19	90.93	90.71
3-18	89.6	80	100	70				87.20	
2-20	81.6	70	90	50				82.15	
1-17	78.3	70	80	70				77.95	
2-21	71.3	70	80	50				71.55	
3-19	50.0	50	80	40				54.73	
3-20	77.5	50	80	40			83.19*	82.67	84.17*
2-12	69.5	80	90	60			68.48	71.37	76.43*
3-46	64.0	60	90	50			75.56*	70.52*	70.27*
3-12	62.6	70	90	70				66.62	
1-26	60.4	50	80	40				63.84	

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON
17-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IIB	44.8	35	55	33	PS	A		45.46	49.82*
2-10	30.9	30	50	20			31.09	26.88	33.37
3-17	12.2	30	50	20				19.61	
1-30	41.7	30	60	30				44.31	
3-37	61.7	30	50	30				56.16	
2-51	27.8	10	20	10				24.86	
1-52	44.4	60	80	60			42.85	43.09	44.05
1-8	81.3	50	70	60			79.85	85.98*	88.08*
2-24	60.1	40	60	30				63.02	
IIG	33.2	40	70	30	N	S		29.91	33.85
2-35	35.0	30	70	10				32.19	
1-24	31.3	50	70	50				27.63	
IIJ1	12.3	20	40	10	A	A		12.69	14.94
1-58	6.1	20	50	10				6.55	
2-58	18.4	20	30	10				18.83	
IIJ2:3-58	15.8	20	30	10	A	A		13.84	14.00
IIN	58.4	47	70	27	A	S		55.25	58.44
3-32	30.2	40	50	30				30.14	
2-23A	90.6	50	80	30				88.04	
B	54.3	50	80	20				47.56	
IIP:1-48	4.8	20	40	20	N	A		4.46	5.83
IIQ	30.4	20	30	15	S	A		29.55	34.07
3-53	36.0	30	30	20				37.14	
2-7	24.7	10	30	10				21.96	

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON
17-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IIR:1-45	92.2	70	90	80	S	A	79.40*	92.69	93.72
IIS	77.0	54	82	50	S	A		75.96	78.42
3-10A	84.7	40	80	40				85.11	
B	80.2	50	90	40				78.58	
1-32	57.8	60	80	70				55.28	
1-18	79.1	60	80	50				84.28	
2-44	80.7	60	80	50				77.55	
IIT1	46.8	40	58	33	PS	A		47.85	50.13*
1-11	75.7	60	70	60			78.76	84.56*	83.87*
2-42	93.3	70	80	60			94.96	94.88	95.80
3-9	76.6	50	80	40			72.94	73.08	74.50
3-24	17.6	30	50	30				25.09	
2-32	19.7	10	10	10				16.05	
3-34	22.1	30	40	10				19.35	
1-46	23.5	40	60	30				23.63	
2-52	44.8	30	70	20				46.15	
IIT2	26.0	26	34	15	A	S		23.67	25.62
3-13	29.7	40	60	30			28.03	29.61	34.66
1-57	11.3	30	50	30				6.48	
2-19A	32.3	20	20	10				29.30	
B	25.1	20	20	10				24.84	
C	31.8	20	20	10				29.10	
IIIA1	47.2	30	45	30	S	S		43.28*	48.67
1-42	63.9	50	70	50			48.93*	57.87*	64.85
2-49	30.5	10	20	10				28.68	
IIIA2	23.3	18	30	25	A	A		23.10	26.16
3-57A	30.2	20	30	40				33.40	
B	34.7	20	30	20				30.39	
C	15.8	20	30	20				15.23	
1-49	12.6	10	30	20				13.37	

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON

17-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IIIB1	23.4	30	45	25	PN	S		18.50*	23.3
1-35	28.3	30	50	30			22.72*	22.90*	28.27
3-50	18.5	30	40	20				14.10	
IIIB2:2-16	8.1	20	30	10	A	A		6.11	9.21
IIIJ	20.0	43	55	35	N	A		19.93	19.99
3-28A	16.7	40	50	30				14.59	
B	27.9	40	50	30				31.48	
C	22.5	40	50	30				22.66	
1-54A	13.0	50	70	50				10.97	
IIIK	54.8	42	62	32	A	A		57.71	60.52*
2-27	62.8	40	60	30			44.20*	64.01*	69.32*
1-37	62.6	50	70	40			53.88*	62.16	67.25
3-31	66.2	60	80	50			70.44*	76.41*	74.67*
2-55	28.7	30	50	10				28.31	
1-21	53.9	30	50	30				57.66	
IIIL:2-29	62.3	40	50	30	S	S		55.56*	62.63
IVA: 2-34	13.5	10	10	10	S	A		11.98	14.06
IVC1	48.7	37	67	37	PS	S		44.12	47.07
1-44A	71.3	40	80	50				62.87	
B	33.0	40	70	40				35.61	
3-56	41.9	30	50	20				44.28	
IVC3	22.3	13	17	13	PS	A		23.78	27.63*
2-57A	38.6	20	30	20				43.84	
B	17.0	10	10	10				17.45	
C	11.2	10	10	10				9.83	

NEEDS AND STRENGTHS AS DETERMINED BY
CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON
17-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IVE	74.8	50	70	50	S	S		70.63*	75.42
1-22A	67.4	50	70	50			52.21*	59.39*	63.62
B	82.2	50	70	50			71.71*	81.87	83.37
IVF	56.6	52	77	47	PS	A		57.01	59.47
3-25	80.1	60	90	60			83.00	82.07	83.30
3-6	27.2	50	80	40			30.26	28.15	33.76*
1-55	50.2	60	80	50			31.76*	43.07*	47.53
2-54	70.0	50	70	40			70.69	77.71*	74.52
2-13	48.9	40	60	40				43.65	
1-39	66.1	50	80	50				67.44	
IVH	40.5	20	40	20	S	S		33.52*	35.82
3-26A	45.1	20	40	20				37.14	
B	37.8	20	40	20				32.06	
C	38.7	20	40	20				31.37	
IVL 1-16	23.0	20	40	20	A	A		21.81	24.53
IVM 2-47	9.0	10	20	10	N	N		11.62*	13.46*
IVR 1-47	20.9	40	70	30	N	S		18.54	19.36
IVU	57.1	65	75	40	N	A		57.98	58.78
2-18	58.3	80	80	50				59.91	
3-23	55.4	50	70	30				56.04	
IV V:3-47	44.9	30	40	20	S	A		44.48	48.39

NEEDS AND STRENGTHS AS DETERMINED BY
CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON
17-Year-Old Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
IVW	61.1	60	80	43	N	N		62.68	63.84
2-46	45.4	50	80	30			43.14	42.79	48.46
3-42	77.3	80	90	50			82.97*	81.06	78.26
1-50	80.9	60	80	60			77.30	82.84	82.29
2-31	39.0	50	70	30			41.01	43.93	46.34*
VA	53.6	40	50	30	S	S		50.36	52.56
3-38	63.5	60	70	40				62.99	
1-13	41.7	20	30	20				37.33	
VB	63.2	40	63	40	S	S		60.89	63.94
1-36A	84.4	40	60	40				83.51	
B	60.0	30	60	40				60.82	
2-26	45.3	50	70	40				38.33	
VC	53.4	20	35	20	S	S		40.15*	42.64*
3-33	26.1	60	90	50				26.28	
1-56	65.2	20	40	30				61.30	
2-56A	57.0	10	20	10				52.46	
B	50.7	10	20	10				44.30	
C	49.8	10	20	10				48.43	
E	71.8	10	20	10				69.39	
VD	54.5	55	80	45	PN	S		51.67	52.4
1-31	39.1	40	70	40			35.21	37.31	37.61
3-55	69.8	70	90	50			64.51	66.03	
VF: 3-16	34.2	NO RESPONSE						30.67	31.23
VH: 2-40	58.3	50	60	30	S	S		53.95	61.36

NEEDS AND STRENGTHS AS DETERMINED BY CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON
17-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
VP1	50.7	55	75	50	N	A		50.53	51.3
2-25	25.6	50	70	30				20.69	
1-51	75.7	60	80	70				80.37	
VP2	39.1	25	45	25	S	S		35.21	41.37
3-52	23.4	20	30	20				17.53	
1-41	54.8	30	60	30				52.89	
VP3	55.7	40	55	20	S	S		51.63	54.91
2-33	83.4	60	80	20				79.42	
3-44	27.9	20	30	20				23.85	
VP4	52.1	20	30	15	PN	A		51.98	55.49
2-50	86.6	20	30	10				84.42	
3-30	17.6	20	30	20				19.54	
VP5	67.5	34	62	36	S	A		67.76	65.71
3-21	77.0	40	70	30				72.67	
1-34A	72.6	40	70	40				74.15	
B	59.1	30	50	30				59.62	
C	73.0	30	60	40				71.49	
D	55.7	30	60	40				60.85	
Following items have no matching objective									
1-7	60.0	70	80	60			51.07	54.36	61.19*
1-10	77.4	60	80	70			73.86	79.16	80.28
1-14	95.7	60	80	60				95.82	
1-15	87.0	60	80	70	Not Rated		74.61*	83.81	88.26
1-19	35.0	40	60	30			28.61	37.30	40.63

(continued)

NEEDS AND STRENGTHS AS DETERMINED BY
CRITERION AND COMPARATIVE MEASURES

BLOOMINGTON
17-Year-Olds Mathematics
1974-75

Objective and Item	Student Performance	Criterion Measures		Teachers' Predicted Outcome	Need, Potential Need, Potential Strength, Strength		Comparative Measures		
		Minimal Acceptable Outcome	Desired Outcome		By Criterion Measures	By Comparative Measures	National Perf.	State Perf.	Similar State Dist. Perf.
(continued)									
1-20	86.5	60	80	60				82.86	
1-29	87.0	40	70	50			80.83*	83.04	85.50
1-38	81.8	60	80	70			77.77	78.67	82.39
2-9	83.9	70	80	60			78.24	83.26	86.69
2-11	57.4	30	40	10			50.64	54.57	57.02
2-14	71.3	50	80	40			61.89*	73.01	73.59
2-15A	67.8	30	40	30			65.29	66.48	70.93
B	71.3	30	40	30			67.75	67.46	77.04
2-17	93.3	60	80	60				90.69	
2-30	51.1	40	60	20			40.31*	51.15	55.67
2-38	58.7	40	50	40			57.90	61.34	67.44*
2-41	92.8	60	80	60				91.09	
2-45	36.5	10	30	10			31.21	33.25	38.34
3-7	45.1	50	80	30			40.72	41.31	43.89
3-35	47.3	30	50	20				37.45	
3-36	32.6	30	50	30			26.78	28.18	31.21
3-39	69.4	30	40	10			68.84	72.67	75.31
3-40	82.4	70	90	70				77.55	
3-43	92.8	80	90	80				92.72	
3-48	82.4	70	90	60			67.34*	76.85*	79.03
3-51	46.5	50	80	40			46.27	48.21	47.01

No X RAted

NINE-YEAR-OLDS CLUSTER ANALYSIS BY REPORTING VARIABLES
PERCENTAGE OF CORRECT STUDENT RESPONSES

	Computation	Computation Fractions	Properties Numbers	Sets	Introduction Fractions	Geometric	Geometric	Problem Solving	Problem Solving	Measurement System Use	
CLUSTER	C-1	C-2	P-1	S-1	F-1	G-1	G-2	PS-1	PS-2	M-1	TOTAL
SIMILAR DISTRICT (N3419)	67.0	48.5	86.0	75.9	27.3*	73.1	29.9	61.5	51.0	47.5	63.1
STATE TOTAL (N=12093)	65.4	47.1	85.3	75.4	25.8	72.0	30.1	60.1	49.8	46.7	61.9
BLOOMINGTON TOTAL (N=550)	66.8	50.3*	87.3*	76.9	32.7*	73.9*	32.4	61.6	53.6*	50.2*	64.4*
GRADE											
Third (N=142)	50.2*	37.4*	81.1*	68.0*	18.5*	62.7*	22.8*	48.3	42.8*	44.4*	53.3*
Fourth (N=407)	72.6*	54.8*	89.5*	80.1*	37.6*	77.8*	35.8*	66.3	57.4*	52.3*	68.3*
SEX											
Male (N=276)	65.3	50.3	87.5	74.4*	33.0	71.8*	36.2*	62.5	54.2	56.3*	64.5
Female (N=271)	68.1	50.0	87.1	79.4*	32.4	76.3*	29.3*	60.7	53.1	44.1*	64.3
PARENTAL DISCUSSION											
Never (N=89)	63.9	46.0	84.9	75.2	31.3	69.4*	29.1	58.6	51.7	43.6*	61.4
1 or 2/month (N=61)	65.3	48.2	84.3	76.7	34.5	71.9	30.7	62.6	53.9	52.0	63.5
1 or 2/week (N=109)	70.3*	54.3*	90.0*	78.5	30.7	77.4	31.9	63.7	55.3	54.9*	66.9
Everyday (N=288)	66.7	50.9	87.7	77.2	33.7	74.8	33.9	61.5	53.8	50.6	64.8
ATTITUDE TOWARD MATHEMATICS											
Least Favorite (N=71)	60.2*	46.7	81.7*	72.5	28.7	69.3	33.1	59.9	49.5	50.5	60.4*
Not Among Favorite (N=114)	58.6*	42.3*	84.3*	73.6	26.9*	68.0*	24.9*	54.4*	46.9*	46.5	58.4*
Favorite (N=365)	70.6*	53.5*	89.2*	78.5*	35.2*	76.6*	34.6*	64.2*	56.5*	51.1	67.0*
PUPIL S.E.S.											
Low (N=34)	59.2	39.9*	77.0*	67.7	25.6	61.5*	24.7	53.8*	44.7*	38.1*	55.1
Middle (N=280)	66.3	49.2	87.4	77.1	32.6	73.1	31.0	59.3*	52.1	49.3	63.5
High (N=192)	70.3*	56.4*	89.3*	80.4*	34.8	77.1*	34.6	66.9*	58.4*	53.6*	68.2*

* Indicates significant difference between means at the .05 level of significance in comparisons with statewide results.
(N is number of subjects)

THIRTEEN-YEAR-OLDS CLUSTER ANALYSIS BY REPORTING VARIABLES
PERCENTAGE OF CORRECT STUDENT RESPONSES

	Computation	Computation Fractions	Decimals	Properties Numbers	Properties Factors	Recognition Symbols	Geometric	Geometric	Algebraic	Algebraic	Measure	Interpreting (graphs,maps)	Problem Solving	Problem Solving	Metric	BLOOMINGTON TOTAL	STATE TOTAL
CLUSTER	C-1	C-2	C-3	P-1	P-2	D-1	G-1	G-2	A-1	A-2	M-1	I-1	PS-1	PS-2	MM-1		
STATE TOTAL	86.7	39.4	36.5	55.3	53.5	55.5	69.3	42.5	56.2	38.1	56.3	69.9	51.5	56.0	50.0		56.7
BLOOMINGTON TOTAL	87.7	43.7*	38.9*	57.0	56.7*	56.5	68.8	46.7*	57.8	43.7*	59.4*	72.3*	54.8*	60.8*	55.7*	59.1*	
GRADE																	
Seventh (N=143)	87.9	31.7*	30.1*	53.3	53.1	52.1*	61.6*	37.9*	51.2*	36.9*	53.6*	69.1*	49.6*	55.9*	45.0*	53.3*	48.7
Eighth (N=679)	87.6	46.2*	40.6*	57.7	57.3	57.4*	70.2*	48.6*	59.1*	45.1	60.5*	72.9*	55.7*	61.8*	57.8*	60.3	61.2
SEX																	
Male (N=413)	85.1*	43.6	40.1	58.7	57.8	55.3	69.9	48.2	54.7*	42.3	61.3	74.0*	57.5*	60.0	57.5	59.3	56.3
Female (N=405)	90.3*	43.8	37.7	55.1*	55.9	58.0	67.9	45.6	61.4*	45.5	57.2*	70.7*	51.9*	61.7	53.4*	59.1	57.2
PARENTAL DISCUSSION																	
Never (N=65)	85.3	38.3	32.8	56.2	47.0*	53.6	63.2	40.7*	52.9	42.6	55.4	69.6	51.5	52.7*	50.9	54.7*	50.5
1 or 2/month (N=94)	87.9	40.6	33.9	51.5*	51.7	55.4	66.4	43.7	54.9	39.3	55.1*	67.5*	53.1	58.1	54.3	55.9*	54.6
1 or 2/week (N=255)	87.7	43.4	39.0	58.7	55.0	55.6	68.8	46.8	56.8	42.3	58.4	73.6	55.0	61.8	52.7*	59.1	57.6
Everyday (N=412)	87.9	45.6	41.0	57.3	60.4*	57.8	70.2	48.4	60.0*	45.7	61.6*	72.9	55.6	62.1	58.7*	60.6*	58.1
ATTITUDE TOWARD MATHEMATICS																	
Least Favorite (N=117)	80.3*	25.5*	19.8*	41.5*	43.1*	44.0*	61.7*	38.6*	45.2*	36.2*	51.0*	65.9*	40.8*	47.3*	49.1*	47.4*	46.6
Not Among Favorite (N=338)	85.0*	38.3*	34.1*	55.1	51.4*	53.7*	66.9	42.1*	52.8*	40.3*	55.4*	71.1*	51.7*	58.7*	51.6*	55.8*	55.7
Favorite (N=368)	92.6*	54.0*	50.3*	63.2*	66.6*	63.1*	72.7*	53.4*	67.0*	52.1*	65.9*	75.5*	62.5*	66.9*	61.9*	66.2*	59.9
PUPIL S.E.S.																	
Low (N=63)	88.9	33.4*	27.1*	52.2	49.1*	52.5	64.8	39.4*	55.4	37.5	48.4*	68.5*	44.5*	55.2*	46.3*	53.1*	51.7
Middle (N=492)	86.2*	41.1*	36.3*	54.8*	53.7*	53.8*	66.4*	43.1*	54.6*	41.5*	57.8*	70.6*	52.8*	58.5*	55.0	56.8*	56.1
High (N=265)	90.1*	51.2*	46.7*	62.1*	64.3*	62.3*	74.1*	54.8*	64.5*	49.4*	65.0*	76.3*	60.7*	66.0*	59.7*	64.9*	64.4

* Indicates significant difference between means at the .05 level of significance in comparison with statewide results.

(N is the number of subjects)

Appendix 3.3

SEVENTEEN-YEAR-OLDS CLUSTER ANALYSIS BY REPORTING VARIABLES

PERCENTAGE OF CORRECT STUDENT RESPONSES

CLUSTER	Computation C-1	Computation Fractions C-2	Computation Decimals C-3	Properties Numbers P-1	Geometric G-1	Geometric G-2	Algebraic A-1	Algebraic A-2	Interpreting Graphs I-1	Problem Solving PS-1	Problem Solving PS-2	Measurement System Use M-1	Statistics & Probability SP	Sets S-1	Trignometry T-1	TOTAL
SIMILAR DISTRICT (N=3951)	92.38	63.42	53.64	65.50	64.05	55.07	53.15	38.11	55.36	64.95	46.71	59.57	26.49	73.53	21.30	55.41
MINNESOTA (N=15640)	91.83	61.27	51.84	61.45	61.64	52.45	49.42	35.15	51.41	63.35	44.76	58.36	25.05	70.89	19.68	52.97
BLOOMINGTON (N=642)	91.82	59.32	46.63	65.15	63.75	53.74	50.07	37.67	55.16	63.40	46.19	55.82	25.10	72.43	21.98	53.90
GRADE																
Tenth (N=24)	82.27	32.59*	35.68	42.52*	42.58*	31.63*	26.60*	16.66*	29.99*	37.02*	29.38*	37.87*	17.26	44.91*	10.73*	34.37*
Eleventh (N=522)	92.01	59.73	46.42	65.07	64.65	54.17	50.64	37.85	55.21	63.32	46.40	56.81	24.85	72.06	21.19	54.19
Twelfth (N=96)	93.30	62.08	51.06	70.78*	63.99	55.08	51.96	40.62	59.32	69.01*	49.15	53.84	27.56	81.66*	30.37*	56.57
SEX																
Male (N=305)	90.71	62.73*	48.98	64.93	64.55	56.46*	50.15	38.83	57.25*	64.12	46.68	59.89*	27.10	66.33*	27.00*	54.95
Female (N=333)	93.02*	56.29*	44.67	65.60	63.08	51.34*	50.44	36.80	53.42	63.08	45.99	52.22*	23.33	78.42*	17.58*	53.15
PARENTAL DISCUSSION																
Never (N=64)	86.46*	41.43*	29.94*	53.89*	49.80*	38.93*	32.29*	27.59*	49.59	49.33*	36.72*	48.02*	19.96	54.32*	13.29*	42.06*
1 or 2/month (N=105)	90.41	54.78	44.54	61.64	61.41	50.99	45.75	34.22	52.95	59.98	41.74*	57.03	26.69	67.32	20.65	50.90
1 or 2/week (N=204)	93.18	59.27	43.86	63.88	61.29	52.49	48.94	35.80	54.57	63.06	45.87	54.75	20.40*	73.08	23.57	52.89
Everyday (N=266)	92.90	65.81*	53.95*	70.56*	70.09*	59.53*	56.93*	43.22*	58.11*	68.69*	50.57*	58.19	29.43*	78.65*	23.42	58.92*
YEARS MATH																
0 (N=120)	83.43*	37.37*	24.13*	41.64*	42.36*	33.18*	25.79*	21.15*	39.15*	45.92*	31.71*	47.14*	14.58*	54.94*	10.01*	36.32*
1 (N=193)	91.74	50.43*	39.42*	58.17*	58.12*	46.72*	38.53*	27.17*	48.45*	59.87*	40.17*	48.97*	23.83	68.15	12.52*	47.07*
2 (N=236)	94.94*	73.21*	58.20	76.93*	74.08*	66.16*	66.11*	49.83*	64.13*	72.22*	54.94*	64.92*	28.72*	83.55*	27.65*	61.28*
3 (N=74)	98.38*	81.12*	68.80*	88.88*	83.47*	71.11*	74.94*	59.07*	75.04*	78.60*	60.54*	67.08*	35.72*	81.37*	45.79*	68.50*
YEARS VOC. TECH																
0 (N=334)	92.19	59.94	49.42	66.11	64.04	55.69	50.73	37.79	56.27	63.70	46.71	56.74	24.78	73.73	21.75	54.62
1 (N=148)	91.38	59.61	42.90	61.49	63.37	50.82	50.07	38.71	53.02	62.87	45.58	56.21	30.22	74.51	21.85	53.31
2 (N=92)	91.71	62.14	45.92	68.09	64.60	55.46	51.45	36.02	54.82	62.11	46.92	57.18	25.42	67.26	20.15	54.24
3 (N=63)	92.77	54.52	46.21	65.39	64.94	49.69	48.13	38.33	56.84	66.33	45.80	50.38	17.47*	74.22	26.25	53.30
ATTITUDE TOWARD MATHEMATICS																
Least favorite (N=143)	86.37*	37.97*	27.13*	47.81*	49.21*	39.50*	29.64*	23.65*	41.56*	50.48*	35.27*	46.91*	19.72*	60.63*	9.67*	40.04*
Not among favorites (N=303)	91.60	57.14	44.49	62.46*	62.61	51.02*	47.97	33.09*	52.69*	62.50	43.92*	53.78	22.61	70.06	17.18*	51.70*
Favorite (N=190)	96.84*	79.88*	64.55*	83.03*	77.43*	69.34*	69.77*	56.00*	70.19*	75.39*	58.30*	66.42*	33.91*	85.12*	37.87*	68.38*
PUPIL S.E.S.																
Low (N=45)	89.78	49.83	31.98*	55.63*	49.78*	42.67*	36.44*	26.82*	46.72*	56.56	38.92*	51.70	18.27	61.37	13.32	44.46*
Middle (N=362)	91.68	56.09*	44.07*	63.04*	62.01*	51.45*	47.38*	34.61*	53.07*	60.11*	44.39*	53.96	24.69	70.74	19.32*	51.72*
High (N=231)	92.96	66.70*	54.19*	71.29*	69.32*	60.14*	57.12*	45.08*	60.62*	70.32*	50.86*	59.95*	27.72	78.31*	27.48*	59.61*

*Indicates significant difference between means at the .05 level of significance in comparison with statewide results.
(N is number of subjects)

Appendix 4.1

NINE-YEAR-OLDS PERFORMANCE LEVELS IN PERCENT

Objective-Item			Bloomington	Minnesota	Similar Dist. Minnesota	United States	Similar Dis U.S.
1G1	1-8	Which one of the following figures is a rectangle?	80.56	78.00	80.35	74.03*	82.16
5A4	1-10	Which fraction is the GREATEST?	3.68	2.57	2.54	3.22	2.58
3d1	1-14A	Rectangle: What fractional part of the figure is shaded?	42.44	32.64*	34.87*	30.80*	36.94
3D1	1-14B	Circle: What fractional part of the figure is shaded?	45.34	33.69*	36.25*	31.30*	37.03
2I1	1-15A	Weight Graph: Which boy weighs the most?	90.33	91.32	92.43	88.55	90.64
2I1	1-15B	Weight Graph: Which boy weighs closest to 50 pounds?	72.17	73.59	74.16	60.60*	66.49
2I1	1-15C	Weight Graph: Which boy weighs the least?	89.56	89.93	91.24	84.29*	86.97
3L3	1-21A	Problems with 0: 3+0=	97.23	98.20	97.88	94.26*	95.02
3L3	1-21B	Problems with 0: 3x0=	93.60	90.12*	92.56	81.49*	87.62*
3L3	1-21C	Problems with 0 : 3-0=	96.88	94.46*	93.89*	87.76*	88.45*
XX9	1-24	An angle may be measured in units called	21.97	15.08*	16.53*	14.65*	12.32*
3I2	1-30	What is the value of x in x-3=7?	63.25	57.07*	58.20	49.15*	56.09*
3A2	1-31	762=	86.28	83.47	84.07	74.25*	78.22*
2A1	1-36A	Add: 38+19	84.92	83.93	85.56	79.00*	85.20
2A1	1-36B	Subtract: 36-19	65.49	64.78	67.56	55.03*	62.43
4A1	1-40	How many days will it take the dog to finish 24 biscuits?	53.84	50.70	54.59	37.14*	48.93
4E	1-45	How many blocks does it take to fill the crate?	51.02	51.84	53.48	48.32	52.33
4A1	1-46	By how many miles did the rocket miss its target?	24.95	27.90	30.44*	31.05*	38.89*
4B1	1-49	The no. of stamps the boys have altogether is CLOSEST to which ?	18.93	16.79	29.66*	30.57*	37.64*
1G1	2-10	Which picture shows parallel lines?	54.26	60.81*	61.74*	48.37	55.01
4A1	2-16	If the astro. drinks 3 pt. of H20 a day, how many will he need?	56.21	53.30	57.99	46.04*	54.08
2E	2-23	If x/y represents a number, the number with x & y doubled is	11.54	14.04	13.62	14.96	15.74
2H1	2-32	In the two squares, what is the distance from A to B?	54.47	45.87*	46.12*	36.16*	39.63*
2A4	2-37	Do the following subtraction: 1054 - 865	28.16	32.39	32.62	27.17	31.82
3D1	2-38A	Circle: What fractional part of the figure is shaded?	41.58	30.27*	33.16*	30.80*	36.94
3D1	2-38B	Rectangle: What fractional part of the figure is shaded:	51.30	41.61*	43.22*	31.30*	37.03*
3C1	2-39	Which of the following is equal to 3x5?	81.43	74.75*	75.57*	73.29*	81.69
4A1	2-41	How many words did Marie MISS on all 4 spelling tests?	35.15	25.70*	25.57*	19.45*	21.96*
3A1	2-43	In the number 4,263, what digit is in the tens place?	85.68	84.46	85.28	75.21*	80.82
4A2	2-47	To fig. how long it will take to wash 10 windows, Dorothy could	55.34	55.26	57.47	50.41	54.33
2B1	2-49	Multiply: 9 x 38	45.09	35.88*	40.09	25.23*	33.08*

THIRTEEN-YEAR-OLDS PERFORMANCE LEVELS IN PERCENT

Objective	Item		Bloomington	Minnesota	Similar Dist. Minnesota	United States	Similar Dist U.S.
IIA1	1-6	Do the following subtraction: 1054 - 865.	87.5	80.85*	80.29*	80.02*	80.99*
IIA9	1-11	What is the SMALLEST number divisible by 6, 9, and 12?	26.78	24.29	24.22	20.91*	23.17
ID3	1-15	An angle may be measured in units called	77.72	76.31	78.54	68.71*	77.39
IF2	1-21	Which one is another way of expressing 3,6 x (10**2)?	46.26	36.60*	36.49*	37.49*	36.89*
IIA4	1-22	Which one of the following equals 47/5?	71.08	64.59*	65.32*	64.85*	69.72
IIA6	1-25	Which fraction is the GREATEST?	38.32	31.26*	30.57*	26.18*	33.51
IIB3	1-27	If x is less than 4, then x+7 MUST be	63.91	59.59	59.78	50.10*	52.92*
IIIA1	1-28	If $y are shared equally among 4 boys, how much does each get?	18.32	12.38*	14.69	12.32*	14.93
IIJ1	1-29	What is the probability that heads will turn up on the 4th toss?	29.28	21.46*	22.58*	15.16*	14.57*
IG2	1-30	What is the SQUARE ROOT of 16?	39.96	40.46	38.46	37.32	44.14
IIF1	1-34	If ¼ in. represents 5 mi., 20 mi. is how many inches?	50.42	48.65	50.77	41.58*	51.90
IVA1	1-38	1602 inches of snowfall equals how many inches of water?	63.56	54.99*	54.74*	44.60*	44.62*
IVA1	1-39	How many votes did Candidate A receive? (70% of 4200)	18.89	11.86*	11.95*	11.55*	16.93
IVB2	1-40	How old is John?	88.43	80.34*	82.06*	71.27*	78.59*
VG	1-48	Which candy shape gives Robert the MOST chocolate?	43.03	32.82*	33.93*	28.59*	31.11*
VG	1-49	What fractional part of the large circle is shaded?	73.59	67.14*	67.50*	57.52*	66.77
IG2	2-9	Which one of the following numbers is a PRIME number:	64.90	72.69*	74.23*	58.44	63.76
IIA1	2-11A	Add: 38 + 19	94.08	95.53	95.60	94.30	93.48
IIA1	2-11B	Subtract: 36 - 19	88.00	91.07	91.41	88.90	90.04
IIA1	2-11C	Multiply: 9 x 38	85.53	87.76	88.29	82.56	84.98
IIA1	2-11D	Divide: 125 by 5	94.65	91.60*	92.60	88.53*	91.17
IC3	2-19	What is the diameter of a circle with a radius of 4 inches?	32.08	37.23	36.56	35.96	38.45
IH2	2-21	Which diagram illustrates "Set S is a subset of Set T" ?	63.78	64.21	64.75	58.26	67.45
IIA3	2-24	Do the following problem: ½ x ¼ =	72.74	72.07	73.08	62.25*	65.03
IIB1	2-25	Let a*b = a (a+b), then 2*3 =	43.46	36.54*	35.42*	35.93*	35.86
IIB3	2-26	What is the value of x in x-3=7?	87.81	88.76	87.87	84.62	89.98
IIA6	2-28	Which number is CLOSEST to 3/16?	20.63	24.20	24.76	18.89	20.87
IIJ2	2-32	What is the probability that you will get the red button?	41.35	38.41	37.21	11.16*	11.91*

THIRTEEN-YEAR-OLDS PERFORMANCE LEVELS IN PERCENT

Objective	Item		Bloomington	Minnesota	Similar Dist. Minnesota	United States	Similar Dis U.S.
IVA1	2-34	What fractional part of the group (13 boys, 15 girls) is boys?	28.50	23.18*	24.09	20.41*	23.83
IIIB1	2-35	Draw a graph to show the no. of plantings throughout the week.	57.19	60.88	62.87	39.04*	45.17*
IVB1	2-38	Which expression gives the total distance around the field?	53.03	56.42	52.46	60.69*	63.19*
IVA1	2-39	By how many miles did the rocket miss its target?	81.39	80.97	80.46	80.83	81.80
IVB2	2-42	275 miles at 50 mph will take how many hours?	70.55	65.16*	65.71	59.11*	60.97*
IVG1	2-43	What is the AREA in sq. in. of a square with a perim. of 12 in.?	10.90	9.14	10.31	6.67*	8.58
IVA4	2-47	If n is an odd number, what can you say about n+1?	61.02	55.37*	58.68	51.23*	56.83
VB4	2-48	The lowest price per ounce for rice is	31.64	26.97	26.55	24.46*	24.34*
VG	2-49	In the two squares, what is the distance from A to B?	77.23	74.23	75.44	60.40*	65.62*
IIA3	3-6	Do the following addition: 1/2 + 1/3 =	60.05	44.80*	49.40*	41.87*	51.44
IID1	3-9	What is the measure of the angle when the time is 3:00?	61.15	64.29	65.84	42.96*	49.15*
IC3	3-10	Which line segment is a DIAMETER?	74.81	71.21	72.25	68.04*	74.98
IVB2	3-18	If a+3=b and 3+c=b, then	60.74	58.14	59.70	56.59	61.12
IIA6	3-24A	Which number is the GREATEST?	89.92	88.76	90.67	84.30*	88.88
IIA6	3-24B	Which number is the SMALLEST?	73.30	65.08*	68.62	51.45*	59.62*
IIB1	3-27	If x/y represents a number, the number with x & y doubled is	18.47	15.20	14.58	17.84	17.47
IIIA1	3-30	What is the total cost of 2 lbs. of apples and 1 lb. of pears?	16.63	20.95*	22.97*	20.63	21.30
IIJ4	3-31	In how many different ways can the 3 friends arrange themselves?	29.91	27.58	29.18	30.00	34.44
IIB3	3-32	What is the value of x that satisfies 3x-3=12?	61.92	45.58*	44.64*	38.91*	39.65*
IIA1	3-33	10 x 10 x 10 x 10=	80.13	75.40*	78.56	67.07*	71.59
IVA1	3-36	How many degrees diff. is there between the 2 temperatures?	54.11	47.34*	49.52	38.52*	46.50
IVA1	3-37	How many words did Marie MISS on all 4 spelling tests:	75.45	78.87	77.85	65.58*	70.49
IH2	3-38	What is the union of A=(2,4,5) and B=(1,2,3,6)?	48.78	52.78	56.08*	42.80	44.75
IVI	3-39	Curtain length of 6 ft. 7 in. is CLOSEST to how many inches?	53.03	53.01	53.69	45.58*	49.51
IIIH2	3-43	Which chart shows part of the graph of x=y?	32.39	18.26*	19.16*	13.31*	14.59*
VG	3-46	How many blocks does it take to fill the crate?	91.20	91.06	91.96	82.94*	86.12*

SEVENTEEN-YEAR-OLDSPERFORMANCE LEVELS IN PERCENT

Objective-Item			Bloomington	Minnesota	Similar Dist. Minnesota	United States	Similar Dist U.S.
RB10	1-7	Which fraction is the GREATEST?	58.57	54.36	61.19	51.07	53.00
2B	1-8	If x = 3, what is the value of x2 - 1 ?	79.58	85.98*	88.08*	79.75	86.42
RC10	1-10	1,602 inches of snowfall equals how many inches of water?	76.71	79.17	80.28	73.86	82.30
2T1	1-11	What is the value of x that satisfies 3x - 3 = 12?	75.37	84.56*	83.87*	78.76	82.44
2A	1-12A	Add: 38 + 19	94.79	97.29	97.28	96.99	97.39
2A	1-12B	Subtract: 36 - 19	94.06	93.27	94.66	93.20	94.85
2A	1-12C	Multiply: 9 x 38	87.63	89.77	90.19	89.85	91.10
2A	1-12D	Divide: 125 by 5	96.24	95.65	94.65	94.73	96.41
RA08	1-15	If n is an odd number, what can you say about n + 1?	86.11	83.81	88.26	74.61*	75.59*
RJ01	1-19	What is the probability that heads will turn up on the 4th toss?	35.01	37.30	40.63	28.61	31.37
4E	1-22A	Which had a CONSISTENT batting average between 1967 and 1971?	67.58	59.39*	63.62	52.21*	60.10
4E	1-22B	Which batting average agrees most CLOSELY with the team average?	83.26	81.87	83.37	71.71*	73.29*
RB01	1-29	If a + 3 = b and 3 + c = b, then	86.96	83.04	85.50	80.83*	83.20
3B1	1-35	What is the equation of line A?	29.38	22.90*	28.27	22.72*	25.56
3K	1-37	What is the total cost of 2 lbs. of apples and 1 lb. of pears?	62.88	62.16	67.25	53.88*	59.64
RD01	1-38	Which diagram illustrates "Set S is subset of Set T"?	81.77	78.67	82.39	77.77	81.48
3A1	1-42	Which chart shows part of the graph of x = y?	66.31	57.87*	64.85	48.93*	52.57*
2R	1-45	Which yr. did federal grants for ed. decrease from previous yr.?	91.74	92.69	93.72	79.40*	84.54*
4W	i-50	What is the difference in the sale price of 2 televisions?	82.52	82.84	82.29	77.31	79.20
2B	1-52	If x/y represents a number, the number with x & y doubled is	44.37	43.09	44.05	42.85	48.13
4F	1-55	What is the area of the shaded portion of the figures?	50.24	43.07*	47.53	31.78*	37.01*
1J	2-6	What is the measure of angle E?	56.67	52.70	59.69	54.88	59.12
RF03	2-9	What is the SQUARE ROOT of 16?	83.70	83.26	86.69	78.24*	81.22
2B	2-10	(r + s) - (r - s) =	31.03	26.68	33.37	31.09	36.70
RK07	2-11	Which candy shape gives Robert the MOST chocolate?	57.52	54.57	57.02	50.64*	53.12
2A	2-12	Do the following addition: 1/2 + 1/3 =	69.49	71.37	76.43*	68.48	68.63
RE16	2-14	If ¼ in. represents 5 mi., 20 mi. is how many inches?	71.26	73.01	73.59	61.89*	62.91
RC25A	2-15A	If x and y are negative, then x + y	67,78	66.48	70.93	65.29	67.05
RB08	2-30	Which number is CLOSEST to 3/16?	51.37	51.15	55.67	40.31*	42.32*
RP03	2-31	City property tax on $14,900 is CLOSEST to	39.24	43.93	46.34*	41.01	46.97
2A	2-37	Do the following subtraction: 1,054 - 865	92.33	90.93	90.71	91.19	92.34

SEVENTEEN-YEAR-OLDS PERFORMANCE LEVELS IN PERCENT

Objectives-Items			Bloomington	Minnesota	Similar Dist. Minnesota	United States	Similar Dis U.S.
RD04	2-38	What is the union of a = (2,4,5) and B = (1,2,3,6)?	58.30	61.34	67.44*	57.91	61.90
2T1	2-42	What is the value of x in x - 3 = 7?	93.25	94.88	95.80	94.96	95.97
RJ05	2-45	The chance of drawing a WHITE slip 1st is given by which?	36.50	33.26	38.34	31.21	36.17
4W	2-46	What time should the turkey be put in the oven to be done by 5:00?	45.42	42.90	48.46	43.15	48.42
1Q	2-48	Which one is another way of expressing 3,6 x (10**2)?	72.72	71.09	75.37	64.05*	67.15
4F	2-54	What fractional part of the large circle is shaded?	69.92	77.71*	74.52	70.63	72.46
4F	3-6	What is the AREA in sq. in. of a square with a perim. of 12 in.?	27.22	28.15	33.76*	30.26	35.63
RA09	3-7	What is the SMALLEST number divisible by 6,9 and 12?	45.10	41.32	43.89	40.72	44.25
2T1	3-9	If x is less than 4, then x + 7 MUST BE	76.74	73.08	74.50	72.94	78.18
2T2	3-13	What is the solution set of the equation (x-1) (x+7) = 0?	29.86	29.61	34.66	28.03	33.54
1S	3-14	Which statement follows "All good drivers are alert"?	56.57	50.91	53.68	51.05	51.92
2A	3-20	Which one of the following equals 47/5?	77.59	82.68	84.17*	83.19*	82.46
4F	3-25	275 miles at 50 mph will take how many hours?	80.14	82.07	83.30	83.04	84.70
3K	3-31	Which expression gives the total distance around the field?	66.37	76.41*	74.67*	70.44	69.96
RK14	3-36	How many inches long is the hypotenuse?	32.59	28.18	31.21	26.79	31.14
RN03	3-39	Let a*b = a(a +b), then 2* 3=	69.34	72.68	75.31	68.84	68.86
1C3	3-41	If f (x) =(x + 1), what does f (2) equal?	60.98	55.50	58.18	43.02*	45.77*
4W	3-42	How many packages did the man buy?	77.28	81.06	78.26	82.97*	83.82
2A	3-46	Do the following problem: ½ x ¼ =	63.88	70.52*	70.27*	76.56*	77.04*
RC08	3-48	How many degrees diff. is there between the 2 temperatures?	82.93	76.85*	79.03	67.34*	72.09*
RC20	3-51	How many votes did Candidate A receive (70% of 4200)?	46.52	48.21	47.01	46.27	48.54
5D	3-55	How much more would a person pay buying on credit (vs cash)?	69.99	66.03	67.22	64.53	68.62
RC25B	2-15B	If x and y are negative, then x . y	71.42	67.46	77.04	67.75	70.41
3K	2-27	If $y are shared equally among 4 boys, how much does each get?	62.80	64.01	69.32*	44.21*	46.77*
5D	1-31	The lowest price per ounce for rice is	38.19	37.31	37.61	35.21	36.14